

A SYNOPSIS OF THE ASIAN SPECIES OF DELPHINIUM,
SENSU STRICTO *

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GROUP V

Perennial, from a woody rhizome. Plants hairy, rather low. Leaf blades rounded, not much dissected. Flowers large, the sepals often 20–35 mm. long, sometimes not more than 16 mm., more or less persistent after anthesis and becoming papery in texture, veiny. Spur thick, often 5–8 mm. wide at base in pressed specimens. Largely from central Asia, Himalayan region and surroundings.

Not closely coinciding with any of Huth's sections of the genus.

KEY TO SPECIES

1. Spur from almost equaling to exceeding the sepals in length.
 2. Flowers one to few; stem often less than 2 dm. tall.
 3. Upper sepal ca. 18 mm. long; lamina of upper petal narrow, ca. 2 mm. wide.
 4. Spur 16–18 mm. long. Caucasus. 61. *D. caucasicum*.
 4. Spur 8–14 mm. long. Nepal. 70. *D. nepalense*.
 3. Upper sepal over 20 mm. long; lamina of upper petal wider.
 5. Flowers mostly 1–2 on a stem; upper petal more or less setose at tip. Tibet. 78. *D. wardii*.
 5. Flowers 2–4 (–8) on a stem; upper petal glabrous at tip.
 6. Flowers greenish blue to pale violet; upper petal bilobulate at apex. 75. *D. tsarongense*.
 6. Flowers deep purplish blue; upper petal shallowly emarginate at apex. (Treated in Group VI). 114. *D. pylzowii*.
 2. Flowers several on a stem; stem usually more than 2 dm. tall.
 7. Stem glabrous below, often glaucous.
 8. The stem villous upward and in the inflorescence; sepals blue violet, 13–15 mm. long. West of Peking. 73. *D. siwanense*.
 8. The stem glandular-pubescent above; sepals blue, 20–30 mm. long. Asia Media. 72. *D. propinquum*.
 7. Stem with some hairs.
 9. Sepals hairy on both surfaces.
 10. Petals glabrous; upper sepal 18–25 mm. long. Yunnan. 67. *D. mairei*.
 10. Petals hairy; upper sepal 16–17 mm. long. Himalaya. 77. *D. viscosum*.

* Continued from volume 48, p. 302.

9. Sepals glabrous on inner surface.
 11. Lamina of lower petal subglabrous on surface. Western China and Tibet. 74. *D. trichophorum*.
 11. Lamina of lower petal hairy on the surface.
 12. Flowers few, in lax corymbs or racemes.
 13. Spur 10–20 mm. long; upper petal bidentate and sparsely hairy at the tip. Himalaya. 77. *D. viscosum*.
 13. Spur longer; upper petal emarginate, glabrous. Tibet. (Treated in Group VI). 83. *D. batangense*.
 12. Flowers in racemes 1–3 dm. long; upper petal glabrous.
 14. Spur ca. 10 mm. long; upper petal bidentate. Himalaya. 76. *D. vestitum*.
 14. Spur 15–24 mm. long; upper petal entire. China. 74. *D. trichophorum*.
1. Spur much shorter than upper sepal.
 15. Inflorescence crowded, subcapitate to elongate.
 16. Upper sepal 16–17 mm. long, the spur 8–10 mm. long. Yunnan. 67. *D. mairei*.
 16. Upper sepal 20–22 mm. long, the spur 6–8 mm. long.
 17. Flowers purplish blue; petals dark violet; carpels 5. Afghanistan. 68. *D. minjanense*.
 17. Flowers gray-blue; petals almost black; carpels 3. Kumaon. 62. *D. densiflorum*.
 15. Inflorescence lax, either racemose or corymbose, or 1-flowered.
 18. Upper sepal mostly 15–20 mm. long.
 19. Flowers 1–2, the plant 4–10 cm. tall; sepals glabrous on inner surface. Pakistan. 66. *D. lacostei*.
 19. Flowers several, the plant 15–100 cm. tall; sepals hairy within and without.
 20. Spur 3–4 mm. thick at base.
 21. Lower petioles to ca. 12 cm. long; stem 1–4 dm. tall. Turkestan, Pamir. 61. *D. dasyanthum*.
 21. Lower petioles to ca. 25 cm. long; stem 4–10 dm. tall. Himalaya. 76. *D. vestitum*.
 20. Spur 5–8 mm. thick at base.
 22. Lamina of lower petal 10 mm. long; follicles 3, pubescent. Himalaya. 70. *D. nepalense*.
 22. Lamina of lower petal 7–8 mm. long; follicles 5, glabrous. Pamir Range. 69. *D. molle*.
 18. Upper sepal 20–30 mm. long.
 23. Inflorescence racemose, at least that on the central stem.
 24. Upper petals ciliate on laminae.
 25. Anthers ciliate; carpels 5, glabrous. Pamir. 69. *D. molle*.
 25. Anthers glabrous; carpels pubescent.
 26. Carpels 5; lamina of upper petal bilobulate. Chitral. 71. *D. nordhagenii*.
 26. Carpels 3; lamina of upper petal entire. Bhutan. (Treated in Group VI). 107. *D. muscosum*.
 24. Upper petals glabrous on lamina; anthers glabrous.
 27. Inflorescence glandular; upper sepal 20 mm. long;

- spur 8 mm. long. Transcaucasia. 64. *D. foetidum*.
27. Inflorescence not glandular.
28. Upper sepal 15–20 mm. long; spur 8–12 mm. long, Turkestan. (See Group IX). 223. *D. poltaratzkii*.
28. Upper sepal 25 mm. long; spur 10 mm. long. Sinkiang. 58. *D. aconitioides*.
23. Inflorescence corymbose or with 1 to very few flowers.
29. Leaves deeply divided into many narrow lobes mostly 1.5–2 mm. wide; upper petal bilobulate into pointed narrow lobules, hairy. Eastern Himalaya. 65. *D. glaciale*.
29. Leaves not so finely divided.
30. Plants glandular, especially in upper parts. Himalaya. 59. *D. brunonianum*.
30. Plants not glandular in upper parts.
31. Lobes of petal laminae broad, not sharply pointed. Himalaya. 60. *D. cashmerianum*.
31. Lobes of petal laminae lanceolate, sharp-pointed. Yunnan. 79. *D. wrightii*.

58. *Delphinium aconitioides* Chen, Bull. Fan Mem. Inst. Biol. Peiping (n.s.) 1: 164. 1948.

Root long, thickish; stem 4–5 dm. tall, simple, very pilose; lower leaves long petioled, the blades 7 cm. long, 10 cm. wide, broadly cuneate, deeply 2-parted with cuneate lobes 2–3-fid, then coarsely crenulate incised, sparsely pilose on both sides; upper leaves 2–5 cm. long; raceme 14 cm. long, densely 30-flowered; bracts 2–2.5 cm. long, lance-oblong, bifid apically, ciliate; pedicels erect, the lower 1 cm. long, yellowish green; bracteoles 1–1.3 cm. long, lance-linear, pilose and ciliate; flowers semierect, greenish purple; sepals ovate, the upper sepal 2.5 cm. long, the lateral pair 1.5 cm. long, membranaceous, strongly veined, pilose, lower pair 1.4 cm. long, sparsely pilose, ciliate; spur 1 cm. long, 4 mm. wide at base, acute at apex, yellow-hairy; upper petals 2 cm. long, broad-linear, emarginate, dark violet; lower petals 1.3 cm. long, the laminae ovate, glabrous, violet-black; stamens 6 mm. long; anthers oblong, 1 mm. long; carpels 3, densely yellow-hirsute.

TYPE: *T. T. Yü* 12827, Aug. 21, 1937, from Taucheng Hsien, southern Sinkiang at 3800 m. (PE); not seen. No known material seen. Plant said to be aconite-like in appearance.

59. *Delphinium brunonianum* Royle, Illustr. Bot. Himal. 56. 1834.
FIG. 6, A.

Delphinium moschatum Munro ex Hook.f. & Thoms. Fl. Ind. 53. 1855.
Based on *Munro*, Kanawer; seen (κ).

Delphinium jacquemontianum Camb. in Jacquem. Voy. Bot. 8. pl. 7. 1844.
Based on *Jacquemont* 668 and 2025 (the latter labeled type at P, where seen and also at κ).

Delphinium brunonianum var. *jacquemontianum* (Camb.) Huth, Bot. Jahrb. 20: 392. 1895.

Delphinium brunonianum var. *schlagintweitii* Huth, loc. cit.

Delphinium brunonianum var. *aitchisonii* Huth, loc. cit. These last two varieties were proposed without designating types, although under the species as a whole both Schlagintweit and Aitchison collections were cited, and I have seen samples of both.

From a slender rootstock; plant with a musky odor when fresh, the stem erect, glabrous to soft-pubescent below, glandular-pubescent above, 1–10 dm. tall, simple at least below, leafy; lower petioles to 15 cm. long, vaginate at base, the upper much shorter; leaf blades somewhat reniform in outline, 3–8 cm. broad, more or less pilose especially beneath along the veins, 5-fid to the middle, the segments crenate or dentate incised into ovate subobtuse teeth or short lobes; upper leaves becoming leafy bracts several cm. long, the uppermost simple or usually toothed; inflorescence mostly corymbose, sometimes racemose, few flowered; pedicels erect, coarse, to 15 cm. long; bracteoles hairy, lance-ovate and entire or ovate and trilobed or toothed, rather near the flower, 5–15 mm. long; sepals royal blue to pale blue, veiny, persistent, soft-pubescent with white hairs; upper sepal round-ovate, 20–30 mm. long, almost as wide, obtuse, the spur almost straight, saccate, ca. 8 mm. wide at base, 12–14 mm. long, rapidly narrowed to a conical blunt tip; lateral sepals broadly ovate, 25–35 mm. long, obtuse; lower sepals round-ovate, 25–30 mm. long, 18–22 mm. wide; petals black, the upper with the blade 14–16 mm. long, oblique above, with a rounded erose, sometimes ciliate apex or the tip with 2 lanceolate lobules; spur 11–12 mm. long; lower petals strongly oblique, the rounded blade 6–7 mm. by 4 mm., bearded at base, ciliate, the claw 6–7 mm. long; stamens 7–8 mm. long, strongly expanded, glabrous, the dark anthers 1.2 mm. long; follicles pubescent, 4–5(–7), ca. 12 mm. long; seeds over 1 mm. long, winged on angles.

TYPE: Kunawur, Kongno Pass, *R. Inglis*; not seen.

DISTRIBUTION. Apparently abundant at about 3500 to 6000 m., Himalayan region.

ILLUSTRATION. Bot. Mag. *pl.* 5461. 1864.

REPRESENTATIVE COLLECTIONS. Kashmir: Ludlow 838; Koelz 2508f, 2804, 2835a; Duthie 5301; R. R. Stewart 20176; Polunin 6250; Schlagintweit 1711, 1985, 6306. Afghanistan: Aitchison 957. Chitral: Stainton 2846, 3234; Bowes Lyon 1083. Tibet: Hanbury-Tracy 143; Ludlow & Sherriff 9010, 9925, 1995, 8930; Strachey & Winterbottom 8. Punjab: Koelz 7006, 1233, 1000A, 6703, 10112; Drummond 4348, 4346, 4341. Kumaon: Koelz 21110; Duthie 5301, 745; Wallich 1832; Schlagintweit 9004; Nepal: Lowndes 1283; Swann R8; Sharma E295.

This is a group with considerable variation, in such characters as the presence of white and yellow pubescence especially about the sepals, in size and lobing of bracteoles, in tips of upper petals which may be entire and glabrous, bilobulate and glabrous, entire and bearded, and bilobulate

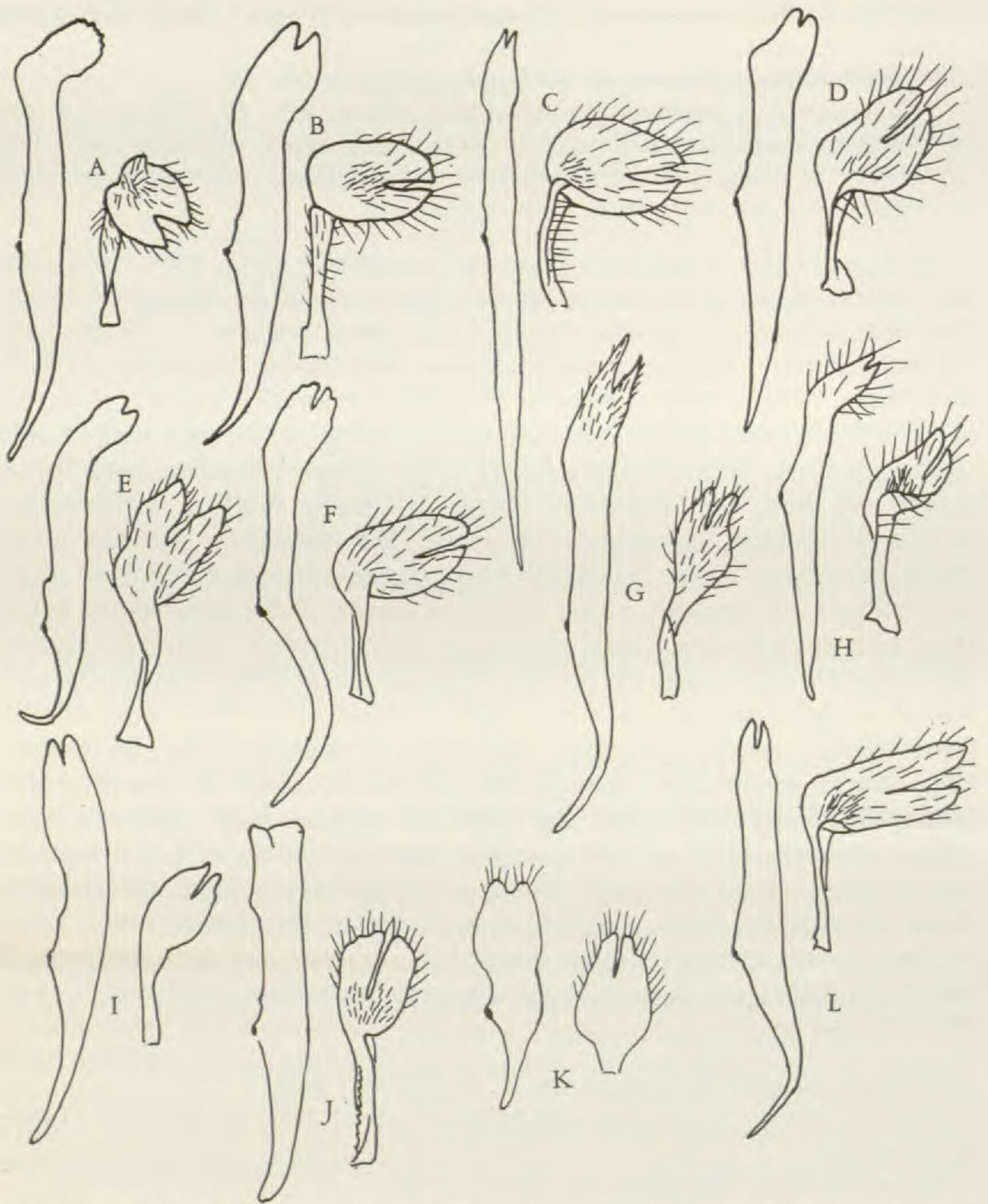


FIGURE 6. *Delphinium*, GROUP V. Petals, the upper spurred, the lower clawed. A. *D. brunonianum*; blade of upper petal 14 mm. long, spur 11 mm., blade of lower petal 6 mm. long, claw 6.5 mm.; drawn from *Koelz 7006* (GH). B. *D. cashmerianum*; blade of upper petal 13 mm. long, spur 11 mm., blade of lower petal 8 mm. long, claw 8 mm.; drawn from *Vaid in 1946* (US). C. *D. caucasicum*; blade of upper petal 12 mm. long, spur 17 mm., blade of lower petal 6 mm. long, claw 7 mm.; drawn from TYPE (LE). D. *D. dasyanthum*; blade of upper petal 11 mm. long, spur 12 mm., blade of lower petal 7 mm. long, claw 6 mm.; drawn from *Gontchezov in 1928* (GH). E. *D. densiflorum*; blade of upper petal 14 mm. long, spur 6 mm., blade of lower petal 7 mm., claw 9 mm.; drawn from *Chand 881* (MICH). F. *D. foetidum*; blade of upper petal 12.5 mm. long, spur 12 mm., blade of lower petal 7 mm. long, claw 6 mm.; drawn from *Karjagin & Isoev in 1933* (GH). G. *D. glaciale*; blade of upper petal 15 mm. long, spur 13 mm., blade of lower petal 7 mm. long, claw 7 mm.; drawn from *J. D. Hooker* (GH). H. *D. lacostei*; blade of upper petal 10 mm. long, spur 12 mm., blade of lower petal

and bearded. In fact, there may be more than one taxon involved, or possible hybridity. One of the characteristics mentioned in the literature, and often on the collection labels, is the musky odor.

60. *Delphinium cashmerianum* Royle, *Illustr. Bot. Himal.* 55. 1834.
FIG. 6, B.

Delphinium aitchisonii Huth, *Bot. Jahrb.* 20: 395. 1895. Based on *Aitchison* in 1877, from Perfun (LE); seen.

Perennial, from slender woody rootstock; stems 1–5 dm. tall, slender, mostly strigose, sometimes with spreading hairs especially above, but non-glandular, simple or frequently branched above, scattered-leafy; lower petioles to 15 cm. long, slender, somewhat dilated at base, upper petioles much shorter; leaf blades reniform-pentagonal in outline, 2–10 cm. broad, mostly somewhat strigulose, palmately 5–7-lobed about halfway to the base, the divisions rather few toothed or lobed into ovate or lance-ovate, obtuse to acuminate teeth or lobules; inflorescence a few-flowered corymb or open corymbose panicle; lower bracts often foliose and divided, the upper entire and ovate to lanceolate; pedicels slender, 1–8 cm. long, strigose or spreading pubescent; bracteoles linear and setaceous to broadly lanceolate, 4–10 mm. long, mostly remote from the flower; sepals bluish purple, rarely pinkish, more or less concavo-convex, persistent, pubescent without and often within, reticulate veined, the upper sepal 20–30 mm. long, 12–15 mm. broad, obtusish, the spur mostly straight, conical, 12–15 mm. long, 5–12 mm. wide at the base, tapering rapidly to the mostly blunt apex; lateral sepals 15–25 mm. long, 6–12 mm. wide, obtuse; lower pair rhombic-obovate, 15–25 mm. by 6–16 mm.; petals dark purple to light blue, the upper pair slightly oblique, the laminae 13 mm. long, glabrous, erose or bidentate, the spur 8–11 mm. long; lower laminae very oblique, oblong-ovate, long-bearded and ciliate, ca. 8 mm. by 5 mm., cleft almost half way, the claw 7–8 mm. long; stamens 6–7 mm. long, well dilated in lower half, glabrous, the dark anthers 1.2 mm. long; follicles 3–7, hairy, 13–15 mm. long, 4 mm. wide, the styles an additional 2–3 mm.; seeds covered with horizontal rows of scales.

TYPE: from the Garden of Shalimer, Kashmir; not seen.

DISTRIBUTION. At roughly 3000 to 5000 m., Himalaya.

ILLUSTRATIONS. ROYLE, *Illustr. Bot. Himal. pl.* 12. 1833. *Bot. Mag. pl.* 6189. 1875, and *pl.* 6830. 1885, the latter as var. *walkeri* Hook. f.

REPRESENTATIVE COLLECTIONS. Kashmir: *Jacquemont* 1005; *R. R. Stewart*

5 mm. long, claw 6 mm.; drawn from *Polunin* 6208 (F). I. *D. mairei*; blade of upper petal 11 mm. long, spur 11 mm., blade of lower petal 5 mm. long, claw 5 mm.; drawn from *Schneider* 2430 (US). J. *D. minjanense*; blade of upper petal 12 mm. long, spur 8.5 mm., blade of lower petal 6 mm. long, claw 7 mm.; drawn from *Koelz* 12713 (US). K. *D. molle*; blade of upper petal 6 mm. long, spur 5 mm., blade of lower petal 5 mm. long, claw 2.5 mm.; drawn from *Lacoste* 11 (P). L. *D. nepalense*; blade of upper petal 13 mm. long, spur 11 mm., blade of lower petal 7 mm. long, claw 6 mm.; drawn from *Dhwoj* 225 (E).

3485, 3759, 6325, 9881, 22179; Koelz 5803, 6026, 2787, 2973; Falconer 65; Dickason 370, 367; Duthie 11560; Ludlow & Sherriff 7914. Punjab: Cooper 5309; Koelz 1313, 6927, 10028, 10041. Kumaon: Strachey & Winterbottom 5, 6; Duthie 744. Garwhal: Schlagintweit 9007. Tibet: Kingdon Ward 12367, 12317a; Schlagintweit 5484; Ludlow & Sherriff 2881, 2814.

61. *Delphinium caucasicum* C. A. Mey. Verzeichnis Pflanzen Caucasus, 200. 1831. FIG. 6, C.

Delphinium speciosum var. *caucasicum* (C. A. Mey.) Huth, Bot. Jahrb. 20: 416. 1895.

Stems pubescent, scarcely taller than the leaves, 1–2.5(–4) dm.; petioles scarcely dilated at the base, 4–10 cm. long; leaves coriaceous, cordate-orbicular, 2–6 cm. broad, tripartite to near the base, the segments broadly obovate, subglabrous except for minute ciliation, incised one-fourth to one-half way into 3 short broad lobes, these entire or few toothed, the teeth oblong-ovate, ca. 5–8 mm. wide; flowers 1–few, subcorymbose, the bracts reduced leaves; pedicels retrorse-hairy, erect, 4–6 cm. long; bracteoles near the middle of the pedicels, petiolulate, oblanceolate, 6–12 mm. long, 1.5–2.5 mm. wide; sepals blue, loosely white-hairy on both sides, quite persistent; upper sepal 18 by 10 mm., attenuate, the spur decurved, 16–18 mm. long, 4 mm. wide at base; lateral sepals ca. 18 mm. by 8 mm., prolonged at apex; lower sepals 20 mm. by 8 mm., attenuate; petals black, the upper lamina almost straight, ca. 12 mm. long, bidentate and glabrous at apex, the spur ca. 16 mm. long; lower laminae oblong-ovate, 6 mm. by 4 mm., bearded and ciliate, bifid almost halfway into approximate lobes; claw bearded, 7 mm. long; stamens 6–7 mm. long; anthers yellow; follicles 3, hairy, 13–15 mm. by 4 mm.; seeds brown, angled, 2 mm. long, inconspicuously squamate.

TYPE: Caucasus, western alps "ad torrentem Malka and in alpebus Kasbek" (LE), seen; rocky places, Meyer?

ILLUSTRATIONS. Semaine Hort. 478. 1898 and Stschukin in Karsten, Veg.-Bild. 20: pl. 18. 1929, according to Index Londinensis. Not seen by me.

SPECIMENS SEEN. Caucasus prope trajectum Mamisson, prov. Terek, *Desulavi* (K); Caucasus, C. A. Meyer 1727 (P); near Shtuch Pass, E. & N. Busch (K).

62. *Delphinium dasyanthum* Kar. & Kir. Bull. Soc. Nat. Mosc. 25: 138. 1842. FIG. 6, D.

Delphinium caucasicum var. *hirsutum* Regel & Herder, Enum. 20. 1864. Type from Santash-Pass in Tussend-Thian; not seen.

Delphinium vestitum var. *hirsutum* Osten-Sacken & Ruprecht, Sert. Tiansch. 38.

Delphinium dasyanthum vars. *undulatum* and *angustisectum* Huth, Bot. Jahrb. 20: 396. 1895. Described as having upper petals bearded and leaf-laciniae narrow, respectively. No specimens cited.

Stem simple, erect, 1.5–4.5 dm. tall, subglabrous to pilose below, with white spreading and some glandular hairs above, scattered leafy to the inflorescence; lower petioles to ca. 12 cm. long, vaginate at the base, the upper shorter; leaf blades rounded in outline, cordate at base, 2–8 cm. broad, glabrous or finely pubescent on both sides especially along the veins, 3-parted halfway or more, the lateral segments often bifid so as to make 5, these broad, cuneate-obovate, coarsely toothed or shallowly lacinate, the teeth broad, subovate, mucronulate; uppermost leaves passing into divided bracts; inflorescence an elongate often crowded raceme, pubescent, the upper bracts lanceolate, to ca. 1 cm. long, hairy; pedicels somewhat divaricate, 1–3 cm. long; bracteoles at base of flower, erect, lanceolate, 4–5 mm. long; sepals deep blue, villous within and without; upper sepal ovate, obtuse, ca. 16 mm. by 10 mm., the spur somewhat decurved, 10–12 mm. long, 4 mm. wide at base, slightly narrowed to the blunt tip; lateral sepals round-obovate, ca. 16 mm. by 16 mm.; lower sepals obovate, ca. 17 mm. by 11 mm., with an apiculate acute apex; petals black, the upper with a slightly oblique lamina 10–11 mm. long, usually almost or quite glabrous, rounded truncate at the emarginate apex, the spur about 12 mm. long; lower petals strongly oblique, the oblong-ovate lamina 7 mm. by 4 mm., cleft ca. 3 mm., with hairs to 2 mm. long; claw 6 mm. long; stamens 6–7 mm. long, glabrous; anthers dark, 1.5 mm. long, oblong; follicles 3, hairy, erect, 1 cm. long; styles an additional 3–4 mm.; seeds transversely lamellate, the scales almost continuous.

TYPE: "Hab. in lapidosis summarum alpium Alatau ad fluviam Sarchan et Baskan," *Karelin & Kiriloff 1169*, in 1841 (LE); isotypes also seen (K, BM, P).

DISTRIBUTION. At elevations of about 3000–5000 m., Turkestan; in ranges like the Pamir, Tien Shan, Alatau, etc.

ILLUSTRATIONS. REGEL, *Gartenfl. pl. 1027*, 1880. POPOV, *Manual Fl. Tashkent*, fasc. 1–2, fig. 172, 1923–24, according to *Index Londinensis*.

REPRESENTATIVE SPECIMENS. Turkestan: *Emme 451*; *Regel* in 1878 and 1882; *Korolkov 76*; *Rajkova 129*.

63. *Delphinium densiflorum* Duthie ex Huth, *Bot. Jahrb.* 20: 393. 1895. FIG. 6, E.

Delphinium densiflorum var. *platycentrum* P. Brühl in Brühl & King, *Ann. Bot. Gard. Calc.* 5: 103. 1896. Based on 3 collections from Kumaon: Ralem Pass, *Duthie* (I have seen *Duthie 2677*); Lebung Pass, *Duthie* (I have seen *Duthie 5303*); and Tangut region near Amdo, *Maximowicz* (not seen).

? *Delphinium brunonianum* Royle var. *densum* Maxim. *Fl. Tangutica*, 24. 1889. Placed here by Huth. I have seen no material.

? *Delphinium densiflorum* var. *stenocentrum* P. Brühl in Brühl & King, *Ann. Bot. Gard. Calc.* 5: 103. 1896. Based on a collection from Bashahr by *Watt*. I have not seen it, but have seen other material from the same locality.

Perennial from a subcylindric rhizome; stem erect, strict, mostly simple, 3–5 dm. tall, fistulose, retrorse-strigose or almost spreading-villous, more

or less glandular, leafy throughout; lower petioles rather fleshy, vaginate at base, somewhat hairy, 5–18 cm. long, the upper shorter; blades reniform to almost round in outline, 5–10 cm. broad, hairy, mostly 5-parted, the segments cuneate-obovate, trifid above, the lobes or teeth mostly rather blunt to almost rounded; uppermost leaves becoming trifid bracts of the very dense racemose inflorescence and with lanceolate lobes and teeth; pedicels appressed to the axis, 1.5–5 cm. long, the bracteoles 2, at middle of pedicel or above, adpressed, linear-lanceolate, 10–18 mm. long, villous; sepals gray-blue to deep blue, often with blue nerves, long white-hairy; upper sepal ovate, ca. 22 mm. by 14 mm., obtuse, the spur subsaccate, 6–8 mm. long, ca. 6 mm. wide at base; lateral sepals oblong-elliptic, 20 mm. by 10 mm., rounded-obtuse; lower sepals rhombic-ovate, asymmetric, 22 mm. by 15 mm., obtuse; petals almost black, the upper with a somewhat oblique, bidentate, glabrous, narrow blade 14 mm. long, the spur 6 mm. long; lower petals somewhat oblique, the bearded lamina oblong-ovate, 7 mm. by 4 mm., cleft for almost 3 mm., the claw 8–9 mm. long; stamens 8–9 mm. long, glabrous; anthers dark, almost 2 mm. long; follicles 3, villous, 5–6 mm. long; seeds brown, 2 mm. long, winged on angles with loose testa.

TYPE: Kumaon, "in parte occid. faucium Lebung, 5300–5600 m.", *Duthie 2677* (G?); isotypes (BM, E, K), seen.

DISTRIBUTION. At about 4000 to 6000 m., Himalaya.

EXAMPLES. Kumaon: *Chand 881*; *Koelz 21082*; *Strachey & Winterbottom 4*; *Duthie 530*. Nepal: *Stainton, Sykes & Williams 3707*; *O. Polunin 1440, 1247*. Garwhal: *Huggins 39*; *Schlagintweit 9180, 9552*.

64. *Delphinium foetidum* Lomak, Act. Hort. Tiflis 2: 285. 1897.

FIG. 6, F.

Delphinium speciosum M. Bieb. var. *brevicalcaratum* Huth, Bot. Jahrb. 20: 416. 1895. Characters given and area from which specimens are cited suggest that Huth's variety may belong here.

Perennial from a creeping rhizome, the stem erect, fleshy, leafy to the top, 2–4 dm. tall, simple, yellowish-pubescent with the spreading hairs enlarged at their base; leaves rounded in outline, 2–5 cm. broad, strigulose above, viscid-pubescent beneath, 2–3-fid, then incisely lobed into obtuse apiculate lobules 3–5 mm. broad; lower petioles to 10 cm. long, dilated at base, upper very short; inflorescence racemose, densely so when young, more lax in fruit; lower bracts foliose, divided; pedicels 1–8 cm. long, erect, glandular-villous; bracteoles oblong-lanceolate, to ca. 12 mm. long, 5 mm. wide, placed near the middle of the pedicel; sepals deep blue, white-hairy on both surfaces; upper sepal ovate, ca. 20 mm. by 15 mm., acute, the spur saccate, slightly curved, ca. 8 mm. long, 5 mm. wide at the base, only gradually narrowed to the obtuse apex; lateral sepals and lower more or less ovate, 20 mm. by 15 mm., rounded at apex; petals dark, the upper with lamina almost straight, 12.5 mm. long, rounded-bidentate at

apex, glabrous, the spur 12 mm. long; lower petal very oblique, ovate-oblong, long-bearded and -ciliate, 7 mm. by 4 mm., cleft $1/3$ its length, the claw 6 mm. long; stamens 7–8 mm. long, the filaments much widened below, glabrous; anthers dark, over 1 mm. long; follicles glandular-hairy, 12 mm. by 5 mm., the styles an additional 3 mm.; seeds brown, slender, 4 mm. long, with many transverse rows of scales.

TYPE: Caucasus: Karabach in Peri-tshingil, 10000 ft., *Medwedew*, 1884 not seen; *Lomakin*, 1895 (LE) seen. I propose the latter as lectotype.

EXAMPLES SEEN. Elisabethpol: Mts. Murov-dagh, *Schelkownikow* 65 (K); Transcaucasia: jugum Zangezour, *Karjagin & Isoev*, in 1933 (BM, GH, K, NY). Iraq: MRO, Qendil, 3000 m., *Rawi & Serhang* 20208 (K).

Very near to *D. brunonianum* but, of course, more western and with a racemose rather than a corymbose inflorescence.

65. *Delphinium glaciale* Hook f. & Thoms. Fl. Ind. 53. 1855.

FIG. 6, G.

Perennial from a slender woody root, the plant with a musky smell; stem softly glandular-hairy to strigulose, 6–15 cm. tall, simple, leafy; leaves reniform in outline, 2–5 cm. in diameter, soft-hairy, the blades tripartite to the base, the segments cuneate, deeply divided into many linear-oblong lobes, acute, mostly 1.5–2 mm. wide; petioles to 5 cm. long, sheathing at the base; flowers inflated-subglobose, few in a corymb; bracts multifid, to ca. 2 cm. long, the petioles broad, with vaginate base; pedicels stout, erect, 2–6 cm. long; bracteoles 3 or more, multifid, 10–15 mm. long, scattered along the pedicel; sepals pale blue, membranous, veined, loosely pilose without; upper sepal obovate, ca. 30 mm. long, almost as wide, subobtuse, the spur slightly curved, saccate, ca. 15 mm. long, 8 mm. wide at the base, narrowed rapidly to a broad tip; lateral sepals almost straight on upper edge, semicircular on lower, 25 mm. by 13 mm., obtuse; lower sepals round-rhombic, ca. 30 mm. long and wide; petals black, the upper almost straight, the lamina ca. 15 mm. long, bearded, sharply 2-lobulate, spur 13 mm. long; lower petals scarcely oblique, the lamina ca. 7 mm. by 3 mm., long bearded and ciliate, cleft to near middle into lance-oblong lobes, the claw broad, 6 mm. long; stamens 8–9 mm. long, ciliate and much widened at base; anthers dark, 2 mm. long; follicles 5, subglabrous, 11–13 mm. long; seeds 1.5 mm. long, winged along the 3 angles.

TYPE: Eastern Himalaya, Sikkim, *J. D. Hooker* at 16–18000 ft. Specimen at Kew has Sept., 1845, Donkia Pass (holotype). Isotypes also seen (BM, E, GH, NY).

DISTRIBUTION. Among boulders, in forest glades, dry scree, etc., 5000–6500 m., Nepal, Sikkim, Bhutan.

ILLUSTRATIONS. HOOKER, *Icon. Pl.* 13: *pl.* 1224. 1877.

REPRESENTATIVE COLLECTIONS. Nepal: *K. N. Sharma* E 482; *Stainton* 1025; *O. Polunin* 1790. Bhutan: *Ludlow & Sherriff* 16786, 17128, 19724; *Gould* 1412. Sikkim: *Ribu & Rhomoo* 5234.

66. *Delphinium lacostei* Danguy, Jour. Bot. Morot 21: 50. 1908.

FIG. 6, H.

Perennial from a slender rootstock; stem 4–10 cm. tall, glabrous or with retrorse-spreading hairs, leafless, 2-flowered at apex; radical leaves several, the petioles 2–8 cm. long, pubescent, vaginate at base; leaf blades round-reniform in outline, 2–5 cm. broad, sparsely pubescent at least beneath, 3–5-parted to about 5–10 mm. from the base; the segments broadly cuneate-obovate, shallowly 3-lobed, then with few round-ovate mucronate teeth; bracts foliose, short- and broad-petioled, trilobed, hairy, or lacking; pedicel ca. 1 cm. long; bracteoles oblong-linear, 5–7 mm. long, subtending the flower; sepals blue, hairy and glandular without; upper sepal ovate, 16 mm. by 10 mm., obtuse, the spur straight, 10–11 mm. long, 5–7 mm. wide at base, obtuse; lateral sepals subelliptic, 14 mm. by 6 mm., obtuse, pubescent along central part, ciliate; lower sepals somewhat asymmetric, ca. 15 mm. by 6 mm., obtuse; petals dark, the upper lamina oblique, bidentate at the long-ciliate apex and 10 mm. long, the spur 12 mm. long; lower petals somewhat oblique, the lamina oblong, 5 mm. by 2 mm., yellow-bearded at the base, white-ciliate and scattered bearded, claw 6 mm. long; stamens 5–6 mm. long, glabrous; anthers dark, 1.2 mm. long; follicles 4–5, glabrous or hairy.

TYPE: Slopes west of Sasser-La, Pamir, West Pakistan, 4950 m., Sept. 7, 1906, *Lacoste* (P); seen.

DISTRIBUTION. At about 4000 to 5500 m., apparently mostly in West Pakistan.

REPRESENTATIVE SPECIMENS. Khagan, *J. L. Stewart* in part; Karakoram, 13 mi. east of Nagar, *O. Polunin* 6208; Pangi, Chamba State, *Lace* 2094.

67. *Delphinium mairei* Ulbrich, Bot. Jahrb. 48: 614. 1913. FIG. 6, I.

Delphinium viride Chen, Bull. Fan Mem. Inst. Biol. Peiping (n.s.) 1: 165.

1948. Type, northwest Yunnan at Atuntze, Yangtze Snow Range, 4100 m.,

T. T. Yü 9670 (PE); photo. (E) seen.

D. mairei Ulbr. var. *viride* (Chen) W. T. Wang, Acta Bot. Sinica 10: 73. 1962.

? *Delphinium fengii* W. T. Wang, Acta Phytotax. Sinica 6: 362. 1957. Based on *K. M. Feng* 2207 from Chung-tien, Yunnan (PE); not seen.

Perennial from a woody rhizome; stem mostly 3–4 dm. tall, simple or nearly so, striate, with somewhat spreading to retrorsely appressed hairs to over 1 mm. long, rather few leaved; lower petioles 5–18 cm. long, with same pubescence as on the stems, dilated-vaginate at base; cauline petioles shorter; leaf blades round-reniform, short-hairy above and below, 2–7 cm. long, 3–10 cm. broad, 3–5-fid to within a cm. or so from the base, the segments broad cuneate-obovate, 3-lobed or -toothed, the lobes then often again toothed, the teeth oblong to ovate, rounded at apex; inflorescence mostly a single subcapitate raceme; bracts leafy, trifid into oblong divisions, hairy, 1.5–2 cm. long; pedicels ascending, hairy, to ca. 1.5 cm.

long; bracteoles densely hairy, ca. 1 cm. long; oblong-linear to elliptic, ca. 1 cm. below the flower or subtending it; sepals dark blue-violet, densely clothed with long whitish or yellowish hairs; upper sepal oblong-ovate, 16–17 mm. long, 14 mm. wide, more or less cucullate, the spur saccate, 8–10 mm. long, 5–6 mm. wide at the base; lateral sepals obovate, asymmetrical, 20 mm. by 14 mm., obtuse, hairy on outer surface; lower sepals 20 mm. by 10 mm., acute; petals blue, the upper almost straight, 11 mm. long, bidentate at apex, glabrous, the spur 11 mm. long; lower petals somewhat oblique, the subelliptic blade apparently not bearded, 5 mm. by 2.5 mm., the margin ciliate to glabrous, 2-lobed ca. 1/3 its length, the claw 5 mm. long; stamens 6–7 mm. long, broad at base, glabrous; anthers dark, ca. 1 mm. long; follicles 3, glabrous or pubescent.

TYPE: Yunnan, Io-chan, 3700 m., *Bonati* distrib. ser. B, no. 2669, coll. *E. Maire*, Aug., 1910; isotype (UC), seen.

Apparently from Yunnan, at 3500–5000 m., as evidenced by *C. Schneider* 2430 (GH, K, US) from near Lichiang, and *C. W. Wang* 71576 (A) from Yunnan.

68. *Delphinium minjanense* Rech. f. Anz. Österr. Akad. Wiss. Math.-Nat. 91: 73. 1954. FIG. 6, J.

Perennial from a woody root; stems in clumps, 1.5–5 dm. tall, fistulose, scattered glandular-pilose below, densely so above, leafy; lower petioles 5–15 cm. long, glandular-pilose; blades rounded in outline, 2–4 cm. long, 4–6 cm. wide, palmately 5-fid to two-thirds or more of their length, glandular-pilose, the segments shallowly incised into broadly round, mucronulate teeth; inflorescence a rather few-flowered raceme, sometimes with 1 or 2 supplementary branches below; lower bracts foliose, divided, ca. 1 cm. long, upper gradually less toothed to entire and lanceolate, glandular-hairy; pedicels glandular-pilose, ascending, 2–4 cm. long; bracteoles 2, lanceolate, 10–14 mm. long, just below or near the middle of the pedicel; flowers fragrant; sepals purplish blue, membranous and veiny in age, rather densely villous; upper sepal broadly ovate, ca. 20 mm. by 14 mm., rounded-truncate, the spur subsaccate, 6–7 mm. long, 5 mm. wide at the base; lateral sepals rhombic-elliptic, 18 mm. by 10 mm., rounded at apex; lower sepals broadly rhombic-ovate, 20 mm. by 15 mm., rounded-obtuse; upper petals dark violet below, paler above, quite straight, the lamina 11–12 mm. long, subtruncate and shallowly 2-lobed at the glabrous apex, spur 8.5 mm. long; lower petals almost straight, bluish, the lamina oblong-obovate, 6 mm. by 4 mm., bearded near the base, ciliate, the claw 7 mm. long; stamens 6–7 mm. long, filaments quite broad at base, ciliate; anther dark, 0.7 mm. long; follicles 5, hairy; immature seeds apparently winged on angles.

TYPE: Afghanistan: Minjan Pass, 12000 feet, July 26, 1937, *Koelz* 12713; isotype seen (US).

Another collection is "Iter Pamiricum, val. Togus-bulak," Aug. 3, 1931, *Lip-schitz* 718 (K).

69. *Delphinium molle* Danguy, Jour. Bot. Morot 21: 51. 1908.

FIG. 6, K.

Stem subglabrous below, with spreading soft white hairs in inflorescence, erect, 2.5–3 dm. tall, scattered leafy; petioles vaginate at base, 1–2 dm. long; leaf blades suborbicular, 5–8 cm. broad, cordate at base, glabrous except for some white hairs along veins on lower surface, almost 5-lobed, the lobes cuneate, variously and obtusely lobulate with shallow, broad, round-ovate, apiculate teeth 3–6 mm. deep and 3–8 mm. broad; flowers few in a lax corymbose raceme; bracts 3-lobed or entire, to 3 cm. long; pedicels arcuate and divaricate, white-pubescent, 4–5 cm. long; bracteoles opposite, well below the calyx, linear-oblong, 12–16 mm. long, 1.5 mm. broad; flowers blue, villous; upper sepal arched, 15 mm. or more long, the spur 5–6 mm. long, 5 mm. wide at base; lateral and lower sepals ovate, 12 mm. by 7 mm., pointed; upper petals bifid at apex, ciliate, the lamina straight, 6 mm. long, spur 4–5 mm. long; lower petals oblong-ovate, lobed to below the middle, ciliate on margin, not bearded near the base; claw scarcely evident; filaments dilated at base, glabrous; anthers oblong, ciliate; follicles 5, glabrous.

TYPE: Borders of River Beik, at 4150 m., July 23, 1906, Pamir Range, Central Asia, *Lacoste 11* (P); seen. This was the only specimen seen; it had quite immature flowers.

70. *Delphinium nepalense* Kitamura & Tamura, Acta Phytotax. & Geobot. Kyoto 15: 129. 1954. FIG. 6, L.

Perennial from an elongate root; stem 1–3.5 dm. long, villous with soft white retrorse hairs, not at all glandular, simple or few branched above; basal leaves rounded in outline, 2–7 cm. in diameter, more or less strigulose on both surfaces and more pubescent beneath, palmatifid into cuneate obovate parts which are mostly 3-lobed in outer portion, then coarsely and broadly toothed with pointed or rounded almost lobelike teeth; lower petioles 3–15 cm. long, somewhat villous, dilated at base; cauline leaves few, gradually reduced above to foliose bracts with dilated petioles and 1–2 cm. long; flowers 2 to several in a subcorymbose arrangement, the sepals blue to purplish, papery, mostly villous without and somewhat so within, very veiny; pedicels ascending to erect, 2.5–8 cm. long, loosely strigose to villous; bracteoles largely opposite, lance-oblong, pubescent, 1–2 cm. long, 3–4 mm. wide, placed at middle of pedicel or above; upper sepal more or less hooded, 1.5–2 cm. long, 1.2–1.8 cm. wide, broadly ovate, obtuse, the spur curved at end, 8–14 mm. long, 6–7 mm. wide at base, obtuse; lateral sepals almost round, 1.6–1.8 cm. across, rounded-obtuse at apex; lower sepals ovate, 1.7–2 cm. by 1.1–1.4 cm., obtuse; petals dark, the upper almost straight, narrow, the limb 13 mm. by 2 mm., with 2 oblong lobes 1.5–2 mm. long, spur 10–12 mm. long; lower petals strongly oblique, the limb oblong, ca. 10 mm. by 4 mm., bearded, cleft to about the middle into subparallel oblong lobes, claw narrow, 7 mm. long; stamens

6–7 mm. long, glabrous; anthers dark, 1.2 mm. long; follicles 3, pubescent, 13 mm. by 4 mm., the style an additional 2.5 mm.

TYPE: Chulu, Nepal, at 6200 m., *Nakao 675* (KYO). I have not been able to see material.

DISTRIBUTION. Growing on gravelly grassy slopes and scree, 4000–5500 m., Nepal and Bhutan.

REPRESENTATIVE COLLECTIONS. **Bhutan:** Thampe Ka, *Ludlow & Sherriff 17128, 19724*. **Nepal:** Khangar, *Lowndes 1505*; Kanjitoba, *Polunin, Sykes & Williams 3533*; Chalika Pahar, *Stainton, Sykes & Williams 3769, 4602*; Mustang, *Stainton, Sykes & Williams 2278*; without exact locality, *Capt. Lall Dhevoj 225*.

71. *Delphinium nordhagenii* Wendelbo, *Nytt Mag. Bot.* 3: 227. 1954.

FIG. 7, A.

Perennial from a woody rhizome, 1.5–3 dm. tall, erect, somewhat strigose below, glandular-pubescent with spreading hairs in the inflorescence, leafy; lower petioles mostly 4–10 cm. long, somewhat dilated at the base, the blades 3–4.5 cm. broad, subreniform, thickish, somewhat pubescent especially beneath, incised to middle with 3–5 lobes variously divided but with broad rounded teeth; inflorescence simple or compound, several flowered; pedicels 2–6 cm. long, glandular-pubescent; lower bracts foliose, trifid into broad lobes with few coarse teeth, the petioles broad, upper bracts mostly 3-lobed, to ca. 1 cm. long; bracteoles opposite, bluish, hairy, 6–14 mm. long, 3 mm. wide, situated somewhat below the flower; sepals deep purplish blue, hairy without, the upper sepals oblong-ovate, 2.2 cm. long, 1.7 cm. wide, obtuse, the spur somewhat decurved, 10 mm. long, 4 mm. wide at base; lateral sepals elliptic with an apiculate tip, ca. 2 cm. long, 1 cm. wide; lower sepals broadly ovate, 2 cm. long, 1.4 cm. wide, apiculate; upper petals almost straight, the lamina 13 mm. long, narrow, the rounded apex more or less pilose, 2-lobed, the spur dark, 12 mm. long; lower petals almost straight, the lamina oblong, 8 mm. by 4 mm., with 2 lance-oblong lobes, 3–5 mm. long, hairy; stamens 8–9 mm. long, sparsely hairy; anthers dark, 1 mm. long; carpels 4–5, bearded, 10–12 mm. long, the style an additional 1.5–2 mm. long.

TYPE: N. W. Pakistan, Chitral, Barum Gol, 4500 m., *Wendelbo* (o); not seen.

Another specimen, from N. E. Chitral and annotated by Wendelbo as *nordhagenii* is Darkot Pass, 4400 m., Aug. 22, 1939, *D. F. Sanders* (BM).

72. *Delphinium propinquum* Nevski in Komarov, *Fl. U.S.S.R.* 7: 124. 722. 1937.

FIG. 7, B.

Stem 1.5–4 dm. tall, glabrous below, short-pubescent, densely glandular-pubescent above; petioles ca. 1 dm. long, pilose, dilated at base; leaf blades 4–6 cm. broad, short pilose on both surfaces, trifid almost to the base, the middle segment obcordate, divided into 3 lobes, each with 3–5 oblong to

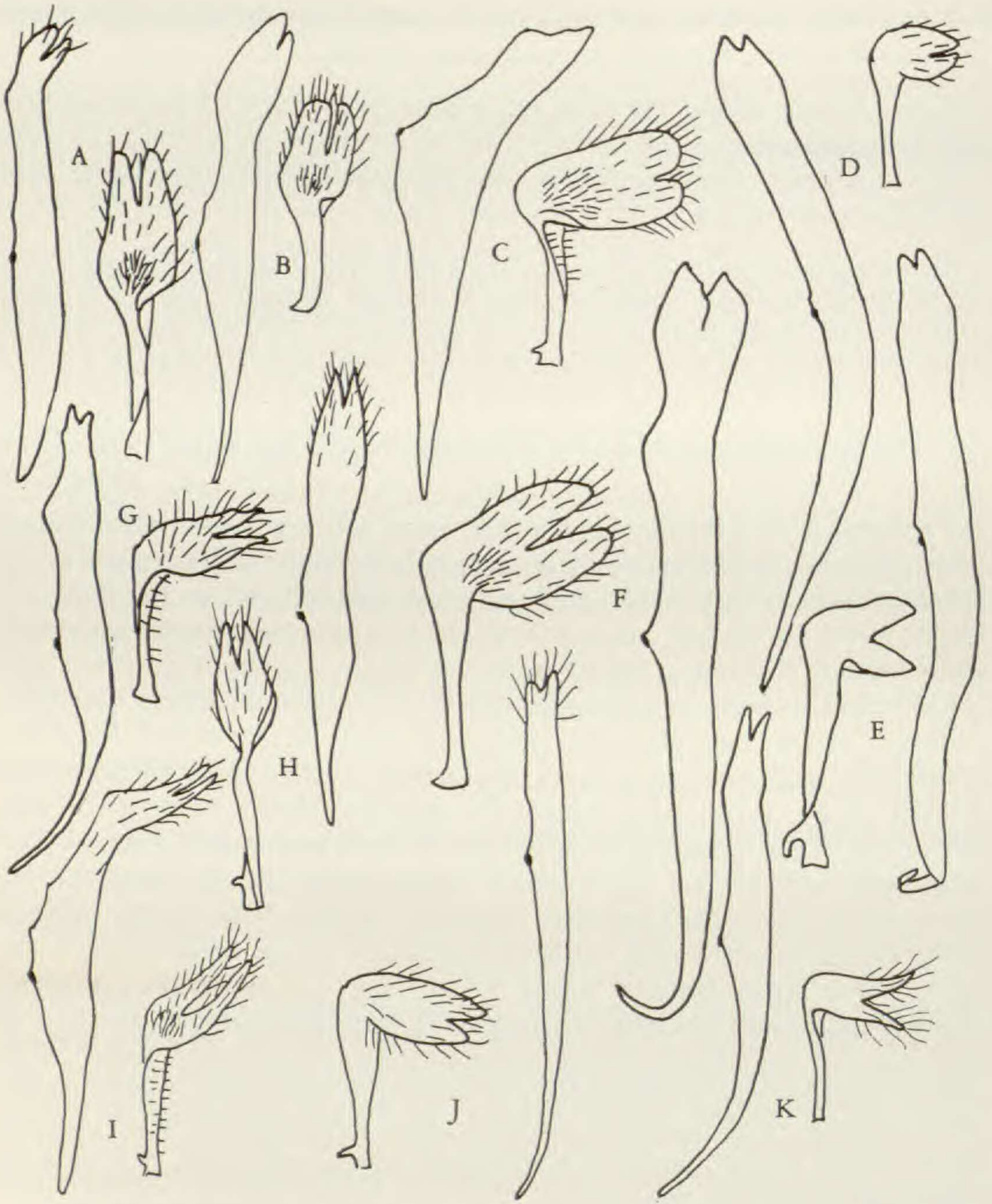


FIGURE 7. *Delphinium*, GROUP V. Petals, the upper spurred, the lower clawed. A. *D. nordhagenii*; blade of upper petal 13 mm. long, spur 12 mm., blade of lower petal 8 mm. long, claw 7 mm.; drawn from Sanders in 1939 (BM). B. *D. propinquum*; blade of upper petal 12 mm. long, spur 13 mm., blade of lower petal 5 mm. long, claw 6 mm.; drawn from Lipsky 1922 (LE). C. *D. siwanense*; blade of upper petal 12 mm. long, spur 20 mm., blade of lower petal 7 mm. long, claw 7 mm.; drawn from David TYPE (P). D. *D. trichophorum*; blade of upper petal 17 mm. long, spur 23 mm., blade of lower petal 4 mm. long, claw 7 mm.; drawn from Mussot in 1897 (UC). E. *D. trichophorum*; blade of upper petal 17 mm. long, spur 20 mm., blade of lower petal 5.5 mm. long, claw 10 mm.; drawn from Rock 18237 (GH). F. *D. tsarongense*; blade of upper petal 22 mm. long, spur 22 mm., blade of lower petal 11 mm. long, claw 12 mm., drawn from Harry Smith 11285 (MO). G. *D. vestitum*; blade of upper petal 13 mm. long, spur 13 mm., blade of lower petal 7 mm. long, claw 7 mm.; drawn from Nath 437 (US). H. *D. viscosum*; blade of upper petal 14 mm. long, spur 11.5 mm.,

subovate teeth, the lateral segments divided into lobes like those of the middle segment; raceme few flowered, glandular-pubescent; bracts (at least the lower) foliose, divided; pedicels 2–4.5 cm. long, densely short-pubescent and with longer soft hairs; bracteoles linear-lanceolate, obtusely acuminate, 7–15 mm. long, 2–3 mm. wide, pilose; flowers large, blue; sepals 2–3 cm. long, 1.3–1.8 cm. wide, broadly obovate, obtuse, membranaceous, covered with long flexuous hairs; spur thick-cylindric, 1.4–1.7 cm. long, obtusely acuminate, recurved distally, ca. 4 mm. wide at base; petals black, the upper lamina almost straight, 13 mm. by 3 mm., glabrous, bidentate, the spur ca. 13 mm. long; lower laminae somewhat oblique, 5 mm. by 3 mm., oblong-ovate, white-hairy and -ciliate, the claw 6 mm. long; stamens 7–8 mm. long, glabrous; anthers dark; follicles 3, pilose.

TYPE: Asia Media, "m. Karategin, ad marginem glacei Dibarar," Aug. 10, 1896, *Lipsky no. 1922* (LE); seen.

Delphinium brunonianum, *D. nordhagenii* and *D. propinquum* are closely related, if distinct. I have had abundant material of the first, very little of the other two. *D. propinquum* seems to have the sepal spur much longer in proportion to the blade than do the others. *D. nordhagenii* has a racemose inflorescence and a narrower lamina on the lower petal, while *D. brunonianum* tends to have a corymbose inflorescence and a broader lamina. But I doubt very much that *D. nordhagenii*, at least, is separable from *D. brunonianum*.

73. *Delphinium siwanense* Franchet, Bull. Soc. Philom. Paris, VIII. 5: 162. 1893. FIG. 7, C.

Delphinium cheilanthum Franchet, Pl. David. 1: 22. 1884; not Fisch. in DC., 1817.

Perennial, several dm. tall, the stem glabrous below, glaucous, with short branches, stiff, equably foliose; cauline petioles not dilated at the base, scattered, white-hairy, 3–5 cm. long; blades strigulose, bicolored, 3–5 cm. wide, parted almost to the base into lanceolate segments, these entire or bifid, then with about 3 salient lanceolate lobules or teeth 3–10 mm. long and 2–5 mm. wide; inflorescence and flowers retrorse-pubescent or with few long spreading white hairs; flowers solitary or in small crowded clusters at ends of branches; bracts trifoliate to linear, ca. 1 cm. long; bracteoles linear or subulate, near middle of pedicel, ca. 6 mm. long; sepals blue violet, pubescent, the upper sepal ovate, acute, 13–15 mm. long, the spur straight, somewhat subulate, 18–20 mm. long, ca. 3 mm. wide at

blade of lower petal 6.5 mm. long, claw 8 mm.; drawn from *Brühl* illustration. I. *D. viscosum*; blade of upper petal 17 mm. long, spur 12 mm., blade of lower petal 7 mm. long, claw 7 mm.; drawn from *R. E. Cooper 802* (E). J. *D. wardii*; blade of upper petal 11 mm. long, spur 20 mm., blade of lower petal 6 mm. long, claw 9 mm.; drawn from *Kingdon Ward 6193* (BM). K. *D. wrightii*; upper blade 13 mm., spur 15 mm. long, blade of lower petal 6 mm. long, claw 5.5 mm.; drawn from *Kingdon Ward 4786* (E).

base; other sepals 14–15 mm. long, abruptly narrowed into a subacuminate tip; petals dark, the upper laminae oblique, 12 mm. long, pointed, glabrous, the spur 18–20 mm. long; lower petals with appendiculate pubescent claw 6–7 mm. long, the limb oblique-obovate, 7 mm. long, with 2 short lobules, long-ciliate, yellow bearded on inner surface; follicles ca. 13 mm. long, very hairy or glabrous, surrounded by sepals until maturity, the styles ca. 3 mm. long; seeds small, ovoid, black, transversely cristate.

TYPE: China, Siwan west of Peking, Sept., 1862, *David* (P); seen. In the type the flowers are solitary and the carpels hairy.

Another specimen apparently referable here is *Licent*, Aug. 1, 1919, on tang-L'Obo, plain of Toumet, no. 5655 (P), with flowers grouped and carpels glabrous.

74. *Delphinium trichophorum* Franchet, Bull. Soc. Philom. Paris, VIII. 5: 166. 1893. FIG. 7, D, E.

Delphinium trichophorum var. *platycentrum* W. T. Wang, Acta Bot. Sinica 10: 75. 1962. Based on *S. K. Wu* 3381, from Muli, Szechwan; not seen.

Delphinium trichophorum var. *subglaberrimum* Hand.-Mazz. Acta Horti Gothob. 13: 48. 1939. Based on *Harry Smith* 11689, from Tafo, Szechwan; isotypes (A, MO); seen.

? *Delphinium trichophorum* var. *tibeticum* Lévl. Pl. Seu-Tchouen, 149. 1918. Spur said to be shorter than sepals; no specimens cited.

Delphinium pellucidum Busch, Bull. Jard. Bot. Pétersb. 5: 134. 1905. Type, E. Tibet, River Nomu-Czu, *Ladygin*, Oct., 1900 (LE); seen.

Delphinium purdomii Craib, Kew Bull. 1912: 380. 1912. Type, Kansu, Michu, 2400 m., *Purdom* 142, cult. Hort. Veitch (K); seen.

Delphinium forrestii Diels, Notes Bot. Gard. Edinb. 5: 265. 1912. Type, Yunnan, e. flank of Likiang Range, 3800–4200 m., Sept., 1906, *G. Forrest* 3030 (E); seen.

Perennial, from a woody root, the stem robust, erect, simple, 3–6 dm. tall, hirsute (to almost glabrous below); leaves mostly basal, reniform-rounded, 3–10 cm. broad, rather shallowly divided into broad, subcuneate, crenate-dentate, obtuse lobules, more or less hairy on both surfaces, the petioles 5–10(–20) cm. long, dilated at base; stem leaves few, much reduced, passing into leafy bracts; inflorescence racemose, usually dense, many flowered, 1–3 dm. long, somewhat peduncled, hirsute; upper bracts entire, lanceolate-oblong, 5–20 mm. long; pedicels erect, 1–5 cm. long; bracteoles lance-oblong, ca. 1 cm. long; sepals ashy blue to dull grayish red or violet purple, densely long-hairy, with white and yellow hairs, persistent in fruit; upper sepal 15–30 mm. long, 8–20 mm. wide, obtuse, the spur 15–24 mm. long, 5–10 mm. wide at base, very hairy, narrowing to a blunt often recurved tip; lateral sepals oblong, 14–17 mm. by 7–9 mm., hairy on whole outer surface; lower sepals 12–17 mm. by 7–9 mm., subacute; petals almost black, the upper often exserted, with a straight bidentate to entire lamina, glabrous, 13–17 mm. long, the spur ca. 20 mm. long; lower petals with an oblong blade 5.5–7 mm. by 3–4 mm., cleft and gaping almost halfway, the lobes ciliate or glabrous, claw 7–10 mm. long;

stamens 7–10 mm. long, glabrous; anther dark, 1.5–2 mm. long; carpels 3, hairy, 10–15 mm. long, the styles an additional 2 mm.; seeds 1.5 mm. long, dark, winged on the angles.

TYPE: Szechwan, Tizou and Tongolo, near Ta-Tsien-lou, Sept., 1891, *Soulié* 23 holotype (P), seen; photo. (E) and isotype (K), seen.

DISTRIBUTION. Between 3700 and 5200 m., eastern Tibet and western China.

REPRESENTATIVE MATERIAL. E. Tibet: Batang, *Soulié* 3909, 3038. Western China: E. H. Wilson 3103, 3106, 3107. Szechwan: *Soulié* 2384, 64, 2386; H. Smith 4421, 11704, 11568, 11574, 12484; E. H. Wilson 2004, 4688, 2044; Rock 18237, 16824. Kansu: Rock 13740; Farrer & Purdom 803, 800, 798. Yunnan: Forrest 22347, 22603, 6683, 16923, 15194, 17064; Yü 14642; Maire 2692; Rock 10860, 11696, 7786, 11458, 10979, 24938, 23090, 23444.

As here treated, rather a variable species, with dense inflorescence, of high western China and adjacent Tibet.

75. *Delphinium tsarongense* Hand.-Mazz. Anz. Akad. Wiss. Wien, Math.-Nat. 59: 245. 1922. FIG. 7, F.

Delphinium tsarongense var. *patentipilum* Wang, Acta Bot. Sinica 10: 76. 1962.
With spreading hairs.

Perennial, from a slender running rootstock; stem 2–10 cm. long, leafy, somewhat purplish, spreading-pubescent, especially upwards; leaves few, the petioles 2–7 cm. long, pubescent, purplish, dilated at the base; blades reniform-oval in outline, 2–6 cm. broad, not so long, somewhat pubescent, mostly 5-lobed to near base, the lobes cuneate-obovate, rounded at apex, 1–2.5 cm. wide, rather shallowly divided into 2–3 broad, rounded-oblong parts, each with 2 or 3 broad, blunt, mucronate teeth; flowers mostly 2–4 on a stem, each in an upper axil of a reduced lobed leaf; pedicels stout, 2–7 cm. long, with a pair of oblong bracteoles ca. 1 cm. long and 2.5 mm. wide, situated ca. 1 cm. below the flower; flower large, greenish blue to pale violet with darker veins, the sepals more or less yellowish-pubescent; upper sepal 2.5–3 cm. long, as wide or wider, obtuse, the spur 1.8–2 cm. long, to almost 1 cm. wide at base, gradually tapered into a broad, sometimes recurved tip; lateral sepals 2–2.5 cm. long, broadly ovate, rounded, pubescent over back surface; lower sepals about the same; upper petals dark, the limb almost straight, 22 mm. long, shallowly bilobed at apex, the spur 22 mm. long; lower petals dark, the blade bearded, oblong, ca. 11 mm. long, divided almost halfway, the claw 12 mm. long; stamens 1 cm. long, lower half of filaments 1.5 mm. wide; anther dark, 1.3 mm. long; carpels 3, bearded.

TYPE: Southeastern Tibet, Tsarong, Doker-la, 4600 m., *Handel-Mazzetti* 7934, Sept. 17, 1915 (holotype (W), not seen; isotypes (E, K, P), seen).

DISTRIBUTION. Tibet and adjacent China at 4000–5000 m.

REPRESENTATIVE MATERIAL. **Tibet:** *G. Forrest* 14665. **Szechwan:** Tachienlu, *Harry Smith* 11285, 11321, 11459. **Yunnan:** *Forrest* 18962, 20979.

76. *Delphinium vestitum* Wall. Cat. n. 4715. 1830, *nomen*; Royle, *Illustr. Bot. Himalaya*. 55. 1834. FIG. 7, G.

Delphinium rectivenium Royle, *Illustr. Bot. Himalaya*. 56. 1834. Based on "N. W. India, Hb. Royle," isotype (κ); seen.

Delphinium vestitum var. *sphenolobum* Brühl ex Huth, *Bot. Jahrb.* 20: 415. 1895.

? *Delphinium vestitum* var. *pumilum* Huth, *loc. cit.* A Turkish specimen by *Regel* in 1877 cited. Out of normal range of *D. vestitum*, hence puzzling.

Perennial from a slender rootstock, the stem simple or branched from below or above, 4–10 dm. tall, rather slender, often reddish, clothed with spreading to retrorse-spreading hairs 1–2 mm. long; leaves mostly basal, with hairy petioles to 2.5 dm. long, dilated at base, the 2 or 3 cauline leaves with much shorter petioles; leaf blades somewhat cordate at base, 5–12 cm. broad, reniform in outline, stiff-hairy on both surfaces, palmately 5–7-lobed to near the middle or less, the lobes broadly cuneate-obovate to rounded, coarsely incised-dentate, the teeth sharp pointed; uppermost leaves smaller, 3–5-lobed; inflorescence of elongate, few- to many-flowered racemes, peduncled, to 2–3 dm. long, spreading-hairy; bracts entire, lanceolate (or the lower lobed), 1–2 cm. long, hairy; pedicels erect, hairy, 1–7 cm. long; bracteoles 2, well above the middle of the pedicel or almost subtending the flower, lanceolate, hairy, ca. 1 cm. long; sepals purplish blue, to dull violet or pale blue, hairy without, sometimes within; upper sepal ovate, 15–20 mm. long, 8–12 mm. wide at base, rapidly narrowed to rather a blunt tip; lateral sepals almost round, ca. 15 mm. by 8 mm., pointed; lower sepals narrower, pointed, about as long; petals black, the upper with an almost straight lamina 13–14 mm. long, bidentate, glabrous, the spur 13–14 mm. long; lower petals with strongly oblique lamina ca. 7 mm. long, 3 mm. wide, cleft almost halfway into pointed lanceolate lobes, hairy on both sides but especially exteriorly, claw 7 mm. long; stamens 8 mm. long, glabrous; anthers dark, 1.5 mm. long; follicles 3, hairy, 8–15 mm. long, 3.5–4 mm. thick, the beak 2 mm. long; seeds narrowly winged, not at all squamate.

TYPE: Wallich Cat. 4715; isotypes seen (BM, E, NY).

DISTRIBUTION. Open grassy slopes and meadows, 2500–4000 m., much of Himalaya.

ILLUSTRATION. BLATTER, *Beautiful Fls. Kashmir* 1: pl. 4. 1927.

REPRESENTATIVE COLLECTIONS. **Kashmir:** *Steane* 60; *Metz* 52; *Duthie* 19119; *Drummond* 4349, 6285. **Punjab:** *Jacquemont* 2134; *Nath* 387, 437; *Koelz* 3077, 21952; *Falconer* 64; *Strachey & Winterbottom* 1. **Kumaun:** *Duthie* 5304; *Strachey & Winterbottom* 7. **Nepal:** *Lall Dhevoj* 128, 92; *Polunin, Sykes & Williams* 5441; *Stainton, Sykes & Williams* 7729, 7733, 8007, 3724, 8586, 8585, 8485, 4401.

77. *Delphinium viscosum* Hook. f. & Thoms. Fl. Ind. 52. 1855.

FIG. 7, H, I.

Delphinium viscosum var. *ciliata* P. Brühl in Brühl & King, Ann. Bot. Gard. Calc. 5: 104. 1896. Based in part on material from Sikkim, without collection numbers, *King's collectors* (CAL), seen.

Delphinium viscosum var. *chrysotrichum* Brühl ex Huth, Bot. Jahrb. 20: 401. 1895; and in Brühl & King, Ann. Bot. Gard. Calc. 5: 104. 1896. Also from Sikkim, *King's collectors*, (CAL), seen.

Delphinium viscosum var. *gigantobracteum* Brühl ex Huth, Bot. Jahrb. 20: 401. 1895 and in Brühl & King, Ann. Bot. Gard. Calc. 5: 104. 1896. From Sikkim, Zeylapla, *King* (CAL), seen, and from Chumbi, near Kung-bur, *King's collector* (CAL), seen.

Delphinium viscosum var. *connectens* P. Brühl in Brühl & King, Ann. Bot. Gard. Calc. 5: 104. 1896. From Sikkim, Sebu Valley, *Gammie*, (CAL), seen.

Delphinium trilobatum Huth, Bull. Herb. Boiss. 1: 330. 1893. Based on a collection from Sikkim, 4000–5000 m., *Anderson*, 1863 (BE); not seen.

Delphinium conocentrum Chatterjee, Kew Bull. 1948: 57. 1948. Type, Sikkim, Jongri to Alotong, 4500 to 5000 m., Oct. 9, 1862, *T. Anderson 345* (K); seen.

Delphinium aureopilosum Chowdhury ex Mukerjee, Bull. Bot. Survey India 2: 293. 1960, *nomen*.

Perennial from a slender rootstock, the stem erect or ascending, 3–8 dm. tall, with short yellow spreading glandular hairs, sometimes subglabrous below, paniculately branched from base, scattered leafy; petioles dilated at base, pubescent, the lower 4–12 cm. long, upper much shorter; blades somewhat round-reniform, 3–10 cm. in diameter, appressed-pubescent to subglabrous on both surfaces, palmately 5–7 (or more)-lobed to near the middle, the lobes coarsely crenate-dentate into broad round-ovate teeth that are glandular apiculate at the tips; upper leaves 3–5 cm. broad, 3-lobed or -parted; inflorescence of a series of few-flowered lax corymbs or racemes; bracts foliose and lobed to membranous or entire, the larger with a broad dilated base, the others ovate to lance-ovate, 1–4 cm. long; pedicels 2–10 cm. long, glandular-pubescent, ascending; bracteoles like the bracts, ca. 1–2 cm. long, near to or remote from the flower; sepals violet-blue to purplish blue, more or less yellowish villous to hirsute without; upper sepal broadly ovate, 1.8–2.5 cm. long, subacute, the spur incurved, shorter than to equaling the blade, ca. 4–5 mm. wide at the base, tapering to a blunt apex; lateral sepals oblong-elliptic, ca. 18–20 mm. by 12–15 mm., obtuse; lower sepals more pointed and narrower; petals dark purple, the upper with a suberect bidentate, sparsely hairy apex, the lamina 12–13 mm. long, the spur 10–17 mm. long; lower petals with lamina somewhat oblique, oblong-ovate, 7 mm. by 3 mm., bearded, cleft about one third its length, the claw 8 mm. long; stamens 6–7 mm. long, glabrous, somewhat dilated below, the dark anthers 1 mm. long; follicles 3, 10–12 mm. long, glabrous except for the ciliate sutures or, in some forms, hairy; seeds winged on angles, 1–1.3 mm. long.

TYPE: Sikkim, 15–16000 ft., *J. D. Hooker* in Hooker f. & Thomson

collection. At Kew there are two sheets in the type folder, Kinchin-jhow, 16000', Sept. 12, 1849, and Phutwong near Tunga, Oct., 15000'.

DISTRIBUTION. Open grassy hillsides or bushy slopes, 3000–5200 m., Nepal to Assam.

ILLUSTRATION. *Ann. Bot. Gard. Calc.* 5: *pl.* 123. 1896.

REPRESENTATIVE COLLECTIONS. S. Tibet: *Ludlow & Sherriff* 2096, 9958, 2721, 10069, 2563. Sikkim: *R. E. Cooper* 605, 1003; *G. H. Cave* 177; *W. W. Smith* 4128. Nepal: *Stainton, Sykes & Williams* 8058, 4689, 7956, 4689; *Sharma* 54, 140. Bhutan: *Ludlow & Sherriff* 21057; *Cooper* 2204, 4911. Assam: *Kingdon Ward* 14329.

78. *Delphinium wardii* Marquand & Airy-Shaw, *Jour. Linn. Soc. Bot.* 48: 157. 1929. FIG. 7, J.

Perennial, the caudex slender, bearing up to 3 flowering stems, these erect, pubescent, to 15 cm. long, leafless or with one small leaf; basal leaves reniform, 5-fid, sparsely pilose on both sides, 4–5 cm. in diameter, the lobes obtuse, trilobulate; petioles pubescent, 2–5 cm. long, dilated at base; bracts spatulate, 1–1.5 cm. long, the 3 lobes 2–3 mm. wide; flowers 1–2, terminal, violet, the sepals silky pilose; upper sepal shortly and broadly apiculate, 25–28 mm. long, 16 mm. wide, the spur slightly de-curved, 17–20 mm. long, 3–4 mm. wide; lateral sepals broadly ovate, obtusely acuminate, 20 mm. long, 15–17 mm. wide; lower sepals ovate, acute, 25 by 18 mm.; upper petals linear, the lamina straight, 13 mm. long, unequally bifid and few haired at the narrowed apex, the spur 21 mm. long; lower petals 16 mm. long, the claw ca. 1 mm. wide, appendaged near the base, bearded, lamina 6 mm. long, bearded, unequally bifid at apex, strongly oblique; stamens 5–7 mm. long, dilated below; anthers dark brown, 1.5 mm. long; follicles 3, pilose on suture.

TYPE: On alpine turf slopes, Tang La, southeastern Tibet, 4200 m., Sept. 20, 1924, *F. Kingdon Ward* 6193 (K), seen; isotypes (BM, E), seen.

OTHER MATERIAL SEEN. Southeastern Tibet: Pa-sum-kye La, 5000–5600 m., *Kingdon Ward* 6124; Bhutan-Tibet border at Phari, 4600 m., *Gould* 1598; Tsarung, Solo-la at 4500 m., *Rock* 22267.

79. *Delphinium wrightii* Chen, *Bull. Fan Mem. Inst. Biol. Peiping* (n.s.) 1: 166. 1948. FIG. 7, K.

Perennial from a woody rootstock, the stem erect, simple, 3–4 dm. tall, with dense spreading white pubescence throughout; leaves mostly basal, reniform, the petioles 4–10 cm. long, densely white-villous, slightly vaginate at base; the blade with a broad deep sinus, wider (4–7 cm.) than long (2–5 cm.), white-hairy on both sides, palmately several-sect to ca. 1 cm., the broad subtruncate segments shallowly round-toothed at the outer edge; cauline leaves 1–2, reduced; inflorescence a more or less secund raceme with ca. 7–11 flowers, densely white-villous; lower bracts trifid, others lance-ovate, 5–10 mm. long, ciliate; pedicels erect, 1–2.5 cm. long,

pilose; bracteoles subtending the flower, lanceolate, 5–7 mm. long, villous; flower horizontal, blue-violet to dull slate-purple, villous; upper sepal ovate, 18–20 mm. long, 10–12 mm. wide, obtuse, the spur 18–20 mm. long, 4–5 mm. thick at the base, strongly decurved; lateral sepals ovate, ca. 15 mm. by 8 mm., obtuse; the lower subacute, ca. 18 mm. by 8 mm.; petals very dark, the upper almost straight, the lamina 13 mm. by 2 mm., with 2 sharply lanceolate lobes at apex, glabrous, the spur ca. 15 mm. long; lower petals strongly oblique, the blade oblong, 6 mm. by 4 mm., split about halfway into 2 strongly divergent lanceolate lobes, claw 5.5 mm. long; stamens glabrous, 6–7 mm. long; anthers dark, 1 mm. long; carpels 3, densely pilose, 15 mm. by 4 mm., the style an additional 3 mm.; seeds brown, winged, almost 2 mm. long.

TYPE: Szechwan, South Sikang, Muli, Shao-siang-liang-tse, 3400 m., *T. T. Yü 7797* (isotype (A); photo. of holotype seen (E)).

DISTRIBUTION. Grassy slopes and among shrubs, 2800 m. to 4200 m., southwestern Szechwan and western Yunnan.

COLLECTIONS SEEN. Yunnan: Chiao-kia Hsien, *H. T. Tsai 52020*. Szechwan: Muli, *Kingdon Ward 4786*; mts. between Wa-Erh-Dje and Muli Gomba, *Rock 16930*.

GROUP VI

Plants perennial from woody, not tuberous, roots. Stems well developed; leaves both basal and cauline, dissected into ultimate linear, more or less oblong segments mostly 1–3 mm. broad. Sepals not markedly veiny or papery, caducous, mostly less than 2 cm. long, the spur narrow, largely 2–3 mm. wide at base.

Not corresponding exactly to any of the sections or other taxonomic subdivisions of the genus that have been proposed.

KEY TO SPECIES

1. Spur 1.5–2 times as long as the upper sepal.
 2. Plant 1–3 dm. tall.
 3. Petals almost black; stem with soft spreading hairs.
 4. Bracteoles well below the flower; upper petal bilobulate; lower petal with pointed lanceolate lobes. Szechwan. 102. *D. malacophyllum*.
 4. Bracteoles against the flower; upper petal entire; lower petal with broad rounded lobes. Yunnan, Tibet. 112. *D. pulcherrimum*.
 3. Petals not darker than the sepals.
 5. Upper sepal 15–22 mm. long; stem strigulose or more loosely pubescent, somewhat succulent. Kansu to Tibet. 114. *D. pylzowii*.
 5. Upper sepal mostly 12–15 mm. long, if longer, the stem loosely pubescent; stems not fleshy.
 6. Stem strigulose; lower petal obovate. Himalaya and southern Tibet. 86. *D. caeruleum*.

6. Stem with looser, often spreading hairs.
 7. Upper petal entire; lower petal narrow-oblong. Yunnan. 120. *D. tenii*.
 7. Upper petal emarginate; lower petal obovate to round.
 8. Lower leaf blades 7–14 mm. long; stem 10–16 cm. tall; sepals 12–14 mm. long. Szechwan. . . 113. *D. pumilum*.
 8. Lower leaf blades ca. 33 mm. long; stem ca. 35 cm. tall; sepals 16–17 mm. long. Kansu. 104. *D. mollipilum*.
2. Plant 3–8 or more dm. tall; stem often strigulose.
 9. Sepals 7 mm. long; leaf segments 3–4 mm. wide. Central Yunnan. 119. *D. tatsienense*.
 9. Sepals longer.
 10. Upper leaves with 3–5 entire lanceolate segments 3–5 cm. long and ca. 5 mm. wide.
 11. Pedicels mostly glabrous; bracteoles 2–5 mm. long; spur 20–22 mm. long. Yunnan. 128. *D. yunnanense*.
 11. Pedicels spreading-puberulent; bracteoles 4–9 mm. long; spur 16–18 mm. long. Kantze. 99. *D. kantzeense*.
 10. Upper leaves not as above.
 12. Stems glabrous, at least above, or with some spreading hairs.
 13. The pedicels with some spreading hairs. Szechwan.
 14. Flowers deep blue, upper sepal 13–20 mm. long; lateral sepals 16–20 mm. 111. *D. pseudograndiflorum*.
 14. Flowers pale sordid-blue, upper sepal 11–12 mm. long; lateral sepals 9–10 mm. 117. *D. sordidecaerulescens*.
 13. The pedicels lacking spreading hairs.
 15. Pedicels glabrous.
 16. Stems glabrous, branched above; lower petal rounded at apex. Yunnan. 120. *D. tenii*.
 16. Stems white hirsute below, simple; lower petal emarginate. Szechwan. 94. *D. dolichocentroides*.
 15. Pedicels loosely strigose. Hupeh. 126. *D. wilsonii*.
12. Stems strigulose.
 17. Laminae of lower petals as broad as long, entire or obscurely emarginate; ultimate leaf segments 1–2 cm. long. 95. *D. grandiflorum*.
 17. Laminae of lower petals longer than broad, bilobed or deeply emarginate; ultimate leaf segments mostly shorter.
 18. Spur ca. 30 mm. long. Szechwan, Yunnan, Tibet. 119. *D. tatsienense*.
 18. Spur 15–25 mm. long. Kansu.
 19. Leaf lobes 2–3.5 mm. wide. 103. *D. maximowiczii*.
 19. Leaf lobes 1.5–1.8 mm. wide. 110. *D. pseudo-caeruleum*.
1. Spur not markedly longer than sepals.
 20. Upper petals dark, almost black.

21. The upper petals with a few bristly hairs at summit, the sepals 20–25 mm. long.
22. Spur 20 mm. long; sepals deep blue. Mongolia. 109. *D. przewalskii*.
22. Spur 12–17 mm. long.
23. Sepals dilute blue; spur 16–17 mm. long. Mongolia. 93. *D. dissectum*.
23. Sepals purplish; spur 12–15 mm. long.
24. The sepals purplish black, the upper 22 mm. long. Mongolia, Dauria. 123. *D. triste*.
24. The sepals purplish blue, the upper 17–18 mm. long. Nepal. (Treated in Group IX). 207. *D. himalayae*.
21. The upper petals glabrous at the tip.
25. Upper sepals 12–15 mm. long.
26. Spur 22–23 mm. long; flowers sordid-bluish. Szechwan. 117. *D. sordidecaerulescens*.
26. Spur 12–14 mm. long; flowers light blue.
27. Inflorescence with some glandular hairs. Transcaucasus.
28. Sepals blue, variegated with white; bracteoles ca. 2 mm. long, near the flower. (Treated in Group IX). 202. *D. elisabethae*.
28. Sepals blue, not variegated with white; bracteoles 10–12 mm. long, just above the middle of the pedicel. (Treated in Group IX). 224. *D. pyramidatum*.
27. Inflorescence strigose, not glandular.
29. Inflorescence an open panicle, the central axis densely many flowered. Transcaucasus to Turkey. 91. *D. crispulum*.
29. Inflorescence racemose or few branched, each branch few flowered. Nepal. 97. *D. incisum*.
25. Upper sepals 16–25 mm. long.
30. The upper sepal ca. 25 mm. long.
31. Lower petal lamina bifid almost to base into lanceolate lobes. Tibet. 108. *D. nortonii*.
31. Lower petal lamina bifid halfway into broad lobes. Kansu, Szechwan. 114. *D. pylzowii*.
30. The upper sepal 15–20 mm. long.
32. Sepals slaty to pale blue, 18–20 mm. long, the spur 15–25 mm. long; lower petal with broad lobes. Kansu. 81. *D. albocoeruleum*.
32. Sepals darker.
33. Bracteoles well below the flower.
34. Lower petal lamina oblong, ca. 8 mm. long. Sikang. 116. *D. smithianum*.
34. Lower petal lamina elliptic-ovate. Kansu to Tibet. 114. *D. pylzowii*.
33. Bracteoles very near the flower; lower petal lamina broadly elliptic.

35. Flowers 1 to few in a subumbellate group; upper petal emarginate at tip. Western China. 96. *D. henryi*.
35. Flowers more numerous.
36. Inflorescence open-paniculate; upper petal entire. Eastern Tibet. 115. *D. rockii*.
36. Inflorescence racemose; upper petal emarginate. Honan. 122. *D. trisectum*.
20. Upper petals bluish to whitish, not darker than the sepals.
37. Flowers several in an inflorescence; sepals largely 8–15 mm. long.
38. Stem glabrous, even up into the inflorescence.
39. Upper petal notched; lower petal lamina ovate.
40. Sepals intense blue to violet, glabrous, the upper one 12–15 mm. long, the spur 15–18 mm. long. Northern Iran. 101. *D. lanigerum*.
40. Sepals violet-blue, pubescent, the upper sepal 11 mm. long, the spur 13–18 mm. long. Western China. 118. *D. sutchuense*.
39. Upper petal entire; lower petal lamina more or less obovate. Western China.
41. Bracts mostly 3-parted; upper sepal 12–15 mm. long; lamina of upper petal 9 mm. long. 103. *D. maximowiczii*.
41. Bracts entire; upper sepal 20 mm. long; lamina of upper petals 12–13 mm. long. 82. *D. autumnale*.
38. Stem with some hairs, at least in the inflorescence.
42. Inflorescence with some yellow glandular hairs.
43. Bracts 2.5–5 mm. long; bracteoles 2 mm. long. Afghanistan. 121. *D. tenuipes*.
43. Bracts 5–15 mm. long; bracteoles 6–10 mm. long.
44. Stems 8–10 dm. tall; sepals 8–11 mm. long. Songoria. 80. *D. aemulans*.
44. Stems to 1.5 dm. tall; sepals 13–16 mm. long. Tibet. 114. *D. pylzowii*.
42. Inflorescence with neither yellow nor glandular hairs.
45. Upper petals blue, the blade 12–16 mm. long; bracts leaflike.
46. Blade of lower petal mostly entire, glabrous except for the basal patch of hair; carpels densely pubescent. Siberia. 89. *D. cheilanthum*.
46. Blade of lower petal usually more or less cleft, bearded almost throughout; carpels subglabrous. Yunnan. 127. *D. yuanum*.
45. Upper petals pale, the blade 8–10 mm. long; bracts mostly not leaflike, but linear to setaceous.
47. Blade of lower petal almost round, 8–10 mm. in diameter, entire to emarginate. Eastern Siberia, through Mongolia to western China. 95. *D. grandiflorum*.
47. Blade of lower petal deeply cleft, 4–5 mm. wide.
48. Pedicels mostly 1–2 cm. long, with a some-

- what recurved tip; bracteoles 2-3 mm. long, placed below the middle of the pedicel.
49. Inflorescence spicate; sepals 13-15 mm. long; spur 15-16 mm. long. Kashmir. (Treated in Group IV). 45. *D. roylei*.
49. Inflorescence corymbose.
50. Sepals 10 mm. long; spur 13 mm. long. Punjab. 100. *D. koelzii*.
50. Sepals 13-17 mm. long; spur 15-17 mm. long. Bhutan. 85. *D. bhutanicum*.
48. Pedicels 1-4 cm. long; bracteoles 2-4 mm. long, placed near the middle of the pedicel; sepals 12-15 mm. long. Himalaya. 92. *D. denudatum*.
37. Flowers mostly 1 to a stem; sepals 15-25 mm. long.
51. Plant quite glabrous on stems and axes.
52. Spur decurved or almost hamate, 20-25 mm. long; bracteoles placed below the middle of the pedicel, 4-10 mm. long. Szechwan. (Treated in Group X). 240. *D. potaninii*.
52. Spur straight or slightly curved; bracteoles above the middle of the pedicel.
53. Spur 15 mm. long; flowers deep blue. Kumaun. 98. *D. kamaonense*.
53. Spur 18-21 mm. long; flowers dull white. Nepal. 125. *D. williamsii*.
51. Plant strigose to hirsute on stems and/or axes of inflorescence.
54. Blade of upper petal emarginate at apex.
55. Spur 10-15 mm. long; plant 7-10 dm. high, short-hirsute. Tibet. 108. *D. nortonii*.
55. Spur 20-25 mm. long.
56. Upper petal yellowish at apex; flowers more or less racemose. Shantung. 88. *D. chefoense*.
56. Upper petal violet or blue at apex; flowers mostly 1-2 on a stem.
57. Sepals sordid-brown or purple-brown, pale on margins; upper petals setose. Tibet. 87. *D. candelabrum*.
57. Sepals blue; upper petals glabrous.
58. Follicles 5; bracteoles at middle of pedicel. Lichiang Range, Yunnan. 84. *D. beesianum*.
58. Follicles 3; bracteoles below the middle of the pedicel. Tibet. 83. *D. batangense*.
54. Blade of upper petal entire at apex.
59. Upper sepal 13-18 mm. long.
60. Spur about 20 mm. long; limb of upper petal 8 mm. long. Yunnan. 106. *D. mosoynense*.
60. Spur 15-19 mm. long; limb of upper petal 6-7 mm. long. Tibet, Kansu. 124. *D. tsoongii*.

59. Upper sepal 20–25 mm. long.
61. Spur 14 mm. long; lamina of upper petal 8 mm. long; blade of lower petal entire, ovate, pointed. Bhutan. 107. *D. muscosum*.
61. Spur 20–30 mm. long; lamina of upper petal 10–12 mm. long.
62. Lamina of lower petal oblong, rounded at tip, much longer than wide; stem 1.5–5 dm. tall.
63. The lamina of lower petal not cleft; petiole bases not conspicuously inflated. Lichiang Range, Yunnan. 84. *D. beesianum*.
63. Lamina of lower petal bifid; petiole bases very conspicuously inflated. Yunnan. 90. *D. coleopodium*.
62. Lamina of lower petal almost round, more or less cleft.
64. Stem to 1.5 dm. tall, subglabrous; flowers solitary. Kansu, Yunnan. 105. *D. monanthum*.
64. Stem 5–8 dm. tall, densely retrorse-strigulose; flowers laxly racemose. Shansi. 88. *D. chefoense*.

80. *Delphinium aemulans* Nevski in Komarov, Fl. U.S.S.R. 7: 161, 725. 1937. FIG. 8, A.

Stems 8–10 dm. tall, to 8 mm. thick at the base, lightly ribbed, with retrorse white hairs below and violet-tinged, densely glandular pubescent under and in the inflorescence, leafy; leaves glabrous, round-reniform, to 1 dm. in diameter, truncate or slightly cuneate at the base, palmatisect almost to base, the segments pinnatifid into lance-linear lobes 2–3 mm. wide, 5–25 mm. long; petioles scarcely enlarged at base, 10–12 cm. long, or the lowermost longer; raceme branched below, dense, many flowered, the axis densely glandular pubescent; bracts linear, 5–15 mm. long; pedicels erect-spreading, 1–2 cm. long, glandular; bracteoles linear-filiform, glandular-pubescent, 6–10 mm. long, 0.5 mm. wide, placed in the upper part of the pedicel; sepals deep blue, ovate, obtuse, glandular pilose; upper sepal ovate, 10 mm. by 6 mm., prolonged into a narrow point; spur 12–13 mm. long, 1.5–1.8 mm. thick, obtusely acuminate and incurved at apex; lateral sepals 11 mm. by 8 mm., ovate, obtuse; lower sepals obovate, 9 mm. by 6 mm., obtuse; petals bluish, the upper laminae somewhat oblique, pale, ca. 8 mm. long, entire, glabrous, the spur 13 mm. long; lower petals strongly oblique, the blade oblong-ovate, 4.5 by 3 mm., bearded and ciliate, bifid more than halfway; claw 4 mm. long; stamens 5.5–6 mm. long, the anthers dark; follicles 3, densely glandular pubescent.

TYPE: Dzungaria, in Monrak Mts. near Zaissan, July 22, 1930, *Gontscharov & Borissova* (LE); seen. Nevski speaks of this species as near

D. dyctiocarpum, but differing in its glandular pubescence. I have, however, placed that species in Group IX.

81. *Delphinium albocoeruleum* Maxim. Bull. Acad. Pétersb. 23: 307. 1877; Fl. Tangut. 1: 23. *pl.* 4. 1889. FIG. 8, B.

Delphinium albocoeruleum var. *pumilum* Huth, Bot. Jahrb. 20: 409. 1895. Described as 10–15 cm. high and from Tibet. The only Tibet specimen cited is *Przewalski* in 1884, which I have not seen. But I have seen several other collections from there.

Stem erect, 1–12 dm. tall, more or less angulate, often purplish, sparsely retrorse-strigulose, leafy, simple or subcorymbosely branched above; basal petioles to 10 cm. long, somewhat dilated at base, upper much shorter; leaf blades cordate at base, 5–8 cm. broad, strigulose above, more loosely pubescent or even silky beneath, 3–5-parted almost to base, somewhat less so in basal leaves, the subrhombic divisions deeply 2–3-fid and incised into lance-oblong, subacuminate teeth or lobules; inflorescence branched, the branches few flowered; bracts trifid or multifid, ca. 2 cm. long; pedicels to ca. 5 cm. long, gray-strigose; bracteoles near summit of pedicel, trifid to simple and lanceolate, 4–8 mm. long; sepals slate purple to pale blue, sometimes pubescent; upper sepal broadly oblong-ovate, 18–25 mm. by 13–14 mm., obtuse to truncate, the spur straight or somewhat decurved, 15–25 mm. long, 3–3.5 mm. wide at base; lateral sepals oblong-obovate, 18–25 mm. by ca. 18 mm., rounded-truncate at apex; lower sepals rhombic-ovate, 18 mm. by 13 mm., with an obtuse apiculation; petals very dark, almost glabrous, the upper laminae slightly oblique, 10–13 mm. long, bidentate at apex, the spur 16–19 mm. long; lower petals strongly oblique, the blade slightly bearded, oblong, 8–20 mm. long, cleft into 2 rather lance-ovate lobes, claw 7 mm. long; stamens 6–7 mm. long, ciliate on filaments; anthers dark, linear, 1.5 mm. long; follicles 3, hairy, 13–14 mm. long, the styles an additional 2 mm.; seeds 1.5 mm. long, triquetrous, with horizontal rows of fused scales.

TYPE: Kansu, "in regione Tangut prope l'Amdo, *Przewalski* 1872" (LE) seen; isotype (K) seen.

DISTRIBUTION. At 3000 to 5000 m., eastern Tibet and southwestern Kansu.

ILLUSTRATION. MAXIMOWICZ, Fl. Tangut. 1: *pl.* 4. 1889.

REPRESENTATIVE COLLECTIONS. Tibet: *Ludlow & Sherriff* 523, 6899; *Ludlow, Sherriff & Taylor* 6921; *Rock* 14467, 14459, 14501, 14505; *Kingdon Ward* 6123, 12244, 12224. Kansu: *Farrer & Purdom* 242, 243, 686 in part; *Rock* 13194.

82. *Delphinium autumnale* Hand.-Mazz. Symb. Sinicae 7: 276. *pl.* 5, *fig.* 5. 1931. FIG. 8, C.

Stem slender, 2.5–4.5 dm. tall, rigid or flexuose, striate, glabrous or with a few spreading hairs and short retrorse-strigulose ones below, equally few-leaved above, often branched; leaves orbicular, 3–9 cm. in diameter, trifid

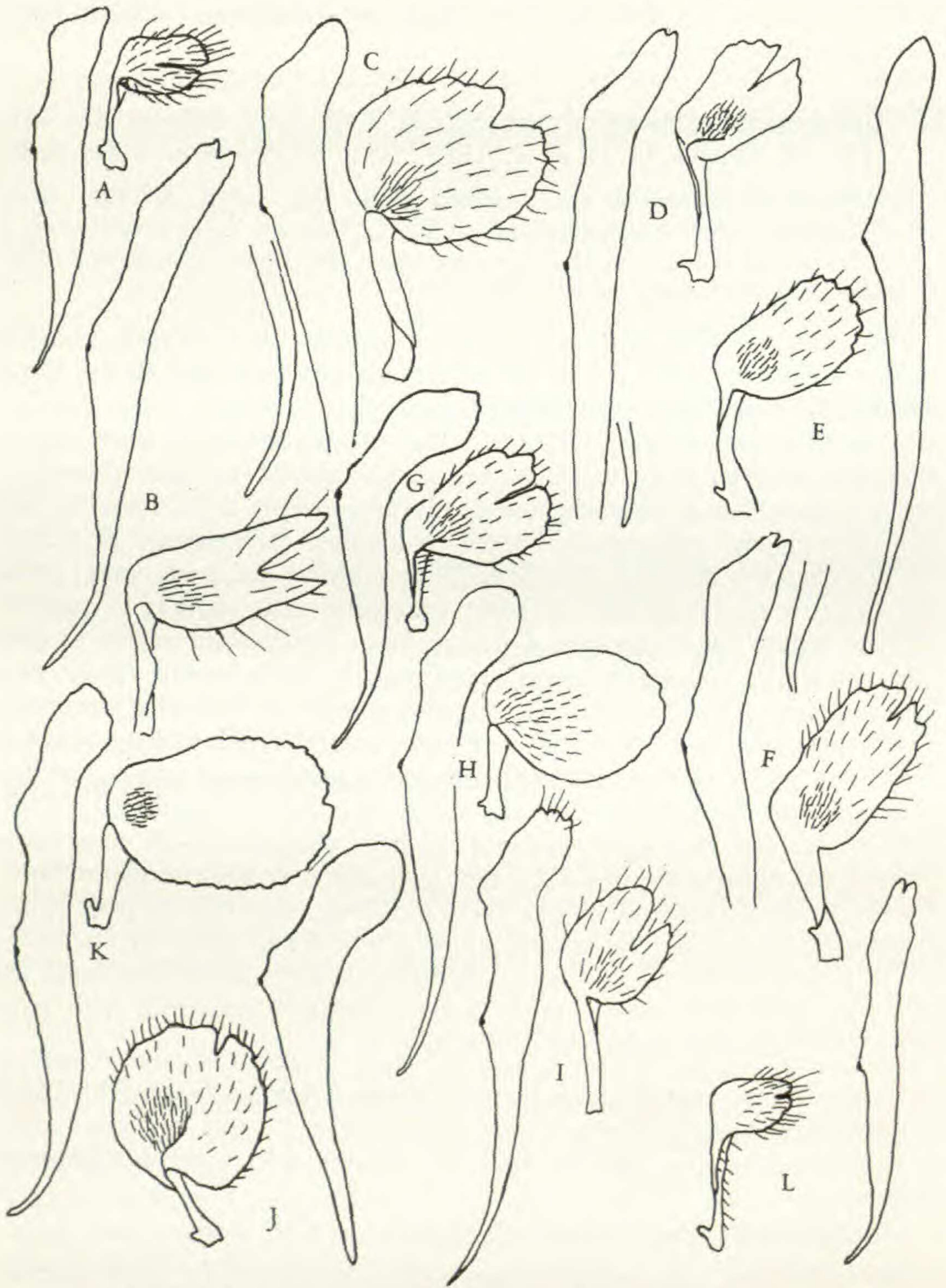


FIGURE 8. *Delphinium*, GROUP VI. Petals, the upper spurred, the lower clawed. A. *D. aemulans*; blade of upper petal 8 mm. long, spur 13 mm., blade of lower petal 4.5 mm. long, claw 4 mm.; drawn from TYPE (LE). B. *D. albo-coeruleum*; blade of upper petal 13 mm. long, spur 19 mm.; blade of lower petal 10 mm. long, claw 7 mm.; drawn from *Rock 14467* (GH). C. *D. autumnale*; blade of upper petal 12 mm. long, spur 25 mm.; blade of lower petal 11 mm. long, claw 8 mm.; drawn from *Handel-Mazzetti 5495* (E). D. *D. batangense*; blade of upper petal 14 mm. long, spur 21 mm.; blade of lower petal 7 mm. long, claw 8 mm.; drawn from *Soulié 3042 bis* (P). E. *D. beesianum*; blade of upper petal 12 mm. long, spur 24 mm.; blade of lower petal 9 mm. long, claw

to base, the lateral segments bifid or trifid, all parts irregularly and distantly divided subpinnately, the ultimate divisions elongate-linear, spreading, 1.5–2.5 mm. wide, acute, thickish, strigulose above and on the revolute margins, with few longer hairs beneath; petioles of lower leaves ca. half as long as the stem, the upper shorter, short-sheathing at base, bearded-ciliate, strigulose above; racemes terminal on stems and branches, to 5-flowered, short, subcorymbose; bracts subulate-linear, to 15 mm. long, ciliate; pedicels equaling spurs or shorter, 1–2.5 cm. long, subglabrous except for some more or less retrorse hairs above; bracteoles near the middle of the pedicels, but often above or below, subulate, ciliate, 4–10 mm. long; flowers blue, horizontal; sepals broadly elliptic, ca. 20 mm. by 10–12 mm., the upper and 2 lower mucronate-thickened at apex, the 2 lateral broadly rounded, more or less erose; spur 25 mm. long, obtuse, 4.5 mm. thick at base, somewhat decurved to the slender tip; upper petals ca. two-thirds the length of the sepals, the blade slightly oblique, pale, 13 mm. by 4 mm., rounded and entire at the apex, glabrous, the spur slender, ca. 25 mm. long; lower petals with an exappendiculate claw 7 mm. long and an oblique limb, roundish or short obcordate, 11 mm. by 8 mm., erose, the surface and margin white-hairy, the base yellow-hairy; stamens 5 mm. long, ciliate; anthers blue, oblong, 1.5 mm. long; follicles 3, hirsute-villous.

TYPE: Sikang province, China; on the Hwang-liangdse, between Yen-yuen and Kwapi; growing on limestone at 3600–3900 m., Oct. 5, 1914, *Handel-Mazzetti* 5495, holotype (probably w), not seen; isotype (E), seen.

83. *Delphinium batangense* Finet & Gagnep. Bull. Soc. Bot. France 51: 478. 1905. FIG. 8, D.

Stem terete, erect or flexuous, 1.5–5 dm. tall, strigulose, divaricately corymbose at summit, few flowered; leaves several, puberulent, sessile or the lower with petioles to 6 cm. long, crowded on lower stem or scattered; blades rounded in outline, 3–4-parted almost to base into obtuse parts, these deeply cut or dentate, with lance-oblong laciniae 2–5 mm. wide and obtuse at apex; branches of inflorescence to 12 cm. long; bracts sessile,

6.5 mm.; drawn from *Forrest* 6694 (US). F. *D. beesianum*; blade of upper petal 13 mm. long, spur 18 mm.; blade of lower petal 10 mm. long, claw 7 mm.; drawn from *Forrest* 6364 (ISOTYPE of *D. calcicola*) (US). G. *D. bhutanicum*; blade of upper petal 9 mm. long, spur 15 mm.; blade of lower petal 8 mm. long, claw 5 mm.; drawn from *Ludlow & Sherriff* 887 (E). H. *D. caeruleum*; blade of upper petal 12 mm. long, spur 17 mm.; blade of lower petal 10 mm. long, claw 5 mm.; drawn from *Ludlow & Sherriff* 2400 (BM). I. *D. candelabrum*; blade of upper petal 13 mm. long, spur 16 mm.; blade of lower petal 7 mm. long, claw 7 mm.; drawn from *Ludlow* 332 (E). J. *D. chefoense*; blade of upper petal 10 mm. long, spur 18 mm.; blade of lower petal 8.5 mm. long, claw 5 mm.; drawn from *Zimmerman* 192 (US). K. *D. cheilanthum*; blade of upper petal 16 mm. long, spur 17 mm.; blade of lower petal 13 mm. long, claw 9 mm.; drawn from *Ikonnikov-Galitzky* 3428 (UC). L. *D. crispulum*; blade of upper petal 10 mm. long, spur 12 mm.; blade of lower petal 4 mm. long, claw 6 mm.; drawn from *Grossheim & Schiskin* 305 (UC).

ca. 2 cm. long, 3-parted, the parts 3-lobed, obtuse; pedicels 2–5 cm. long, strigulose; bracteoles 3-lobed, obtuse, ca. 1 cm. long, situated below the middle of the pedicels; flowers 2–4 on a stem, deep blue, ca. half the length of the pedicels; upper sepal round-ovate, 18–20 mm. long, spur arched-recurved, 20–24 mm. long; other sepals ovate, obtuse, short-strigulose, 20–22 mm. long; lamina of upper petals straight, emarginate, glabrous, 13–14 mm. long, the spur 19–20 mm. long; limb of lower petals obovate-oblong, 2-lobed, bearded in the middle, not ciliate, ca. 7 mm. by 5 mm., the claw 8 mm. long, glabrous, appendaged at base; stamens 6–7 mm. long; follicles 3, densely puberulent, 6 mm. long.

TYPE: Tibet, prov. Batang, Zambala & Yargong, in 1903, *Soulié 3042 bis* (P); seen. It is this number at Paris that was dissected and drawn, but *Soulié 3040, 3041, 3042, and 3043* were filed with the type. From the same location, also deposited at Paris, *Soulié 3898 and 3899*.

ILLUSTRATION. Bull. Soc. Bot. France 51: *plate 5, B. fig. 7–11*. 1905.

84. *Delphinium beesianum* W. W. Smith, Notes Bot. Gard. Edinb. 8: 130. 1913. FIG. 8, E, F.

Delphinium beesianum var. *malacotrichum* Hand.-Mazz. Acta Horti Gothob. 13: 60. 1939. Based on *Harry Smith 2985*, Tsepula, Szechwan. Isotypes (A, BM) seen.

Delphinium beesianum var. *malacotrichum* f. *radiatifolium* Hand.-Mazz. *loc. cit.* Type number *H. Smith 11939* from Taofu, Sikang. Isotypes (A, BM, MO) seen.

Delphinium beesianum var. *radiatifolium* (Hand.-Mazz.) W. T. Wang, Acta Bot. Sinica 10: 264. 1962.

Delphinium beesianum var. *latisectum* W. T. Wang, *loc. cit.* 265. Based on *C. W. Wang 64923 and 64995* from Yunnan; not seen.

Delphinium calcicola W. W. Smith, Notes Bot. Gard. Edinb. 8: 130. 1913. Type. *Forrest 6364* from Lichiang Range, Yunnan (E), seen; isotype (US) seen.

Delphinium beesianum f. *calcicola* (W. W. Smith) W. T. Wang, Acta Bot. Sinica 10: 264. 1962.

Rootstock slender, covered with fibrous bases of old leaves; stem 1.5–5 dm. tall, flexuous, branched from below, white- and retrorse-strigulose or more loosely pubescent, the hairs sometimes yellow; lower leaves with purplish slender petioles 5–15 cm. long, strigulose, thin and vaginate at the base; leaf blades 5-fid, roundish in outline, 2–6 cm. in diameter, the segments divided to the middle or below into 2–3 lobes 1–3 cm. long, mostly 1–5 mm. wide, acute, strigulose above, longer hairy beneath; flowers 1–few at the ends of the branches in corymbose fashion; bracts mostly foliose, the petiole short, somewhat inflated, the blade trifid into lanceolate lobes, 1 cm. or longer, pubescent; pedicels pubescent, 2–8 cm. long, pilose; bracteoles above the middle of the pedicel, trifid to entire, 8–12 mm. long; sepals blue with deeper veining, densely pilose, the upper sepal ovate, 22–26 mm. long, 10–15 mm. wide, obtuse, the spur 20–25 mm. long, straight or somewhat curved to the blunt tip, 4–5 mm. wide at the base; lateral

sepals oblong with rounded tip, 23–30 mm. long, 10 mm. wide; lower sepals ovate, about the same size; petals blue, the blade of the upper straight, 12–13 mm. long, entire to emarginate, the spur 18–24 mm. long; blade of lower petals oblong-obovate, 9–10 mm. long, 5 mm. wide, erose to deeply emarginate, claw 6.5–7 mm. long; stamens ca. 8 mm. long, the filaments ciliate; anthers dark, 1 mm. long; follicles 5, white-hairy, ca. 14 mm. by 3.5 mm., the style an additional 3 mm.; seeds brown, winged, 1.5 mm. long.

TYPE: Yunnan, limestone cliffs on east flank of Lichiang Range, 4500 m., Sept. 1910, *G. Forrest 6694* (E), seen; isotypes (K, P, UC, US) seen.

DISTRIBUTION. At about 4000 to 5000 m., in eastern Tibet and western China.

EXAMPLES. **Tibet:** *Rock 14518, 14520, 14523, 14522, 14460, 22267, 13398; Ludlow, Sherriff & Taylor 6379.* **Yunnan:** *Kingdon Ward 1025; Forrest 22577, 21007, 20204; Rock 24738, 10817, 7763, 5421, 11692, 10788, 10776, 17248, 22852; Wang 64995, 69525, 70146.* **Kansu:** *Rock 13092, 14640.* **Szechwan:** *Kingdon Ward 4856; Forrest 22967, 20572; H. Smith 4243, 4326.* **Sikang:** *H. Smith 12619, 12515, 11712, 12421.*

As here conceived this is rather a variable species both as to pubescence and whether the upper petals are entire or not at the apex.

85. *Delphinium bhutanicum* Munz, sp. nov.

FIG. 8, G.

Perennial, to ca. 1 m. high, the stem slender, openly branched above, more or less retrorse-strigulose throughout, scattered leafy; lower leaves withered by anthesis, upper blades 4–10 cm. wide, divided almost to their base into cuneate-rhombic segments finely strigulose above, more or less pubescent beneath especially along the veins, trilobed about halfway, then lobulate into linear-lanceolate to lanceolate lobules 5–15 mm. long, 2–5 mm. wide; petioles slightly dilated at the base; uppermost leaves much reduced and serving as bracts; inflorescence open, 2- to few-flowered, subcorymbose, strigulose, the pedicels suberect, 2–5 cm. long; upper bracts lanceolate, ca. 1 cm. long; bracteoles broadly linear, 4–6 mm. long, slightly below the flower; sepals blue, strigulose, the upper broadly obovate, 15–16 mm. by 11–12 mm., subtruncate at apex, spur 15–16 mm. long, ca. 3 mm. wide at base, spreading-decurved; lateral sepals oblong-obovate, 16 mm. by 8 mm., rounded at apex; lower sepals slightly shorter and wider; petals blue, lamina of upper somewhat oblique, 9 mm. by 3 mm., glabrous, entire at the somewhat rounded tip, spur ca. 15 mm. long; lamina of lower petal obovate, 8–9 mm. by 5–7 mm., bifid ca. 3 mm. into 2 rounded-oblong lobes, white-bearded throughout, the claw 5 mm. long; stamens 5–6 mm. long, glabrous; carpels 3, pubescent, 11–12 mm. by 3.5–4 mm., the style an additional 2–2.5 mm.; seeds winged on the angles.

Planta perennis, ad ca. 1 m. alta, tenuis, supra ramosa, strigulosa; laminae foliorum superiorum 4–10 cm. latae, alte divisae, segmentibus cuneato-rhombicis, supra strigulosae, infra pubescentes, laciniis ultimis 5–15 mm. longis, 2–5 mm. latis; inflorescentia laxa, floribus 2–paucis,

subcorymbosa; pedicelli suberecti, 2–5 cm. longi; bracteae foliosae, superiores lanceolatae, ca. 1 cm. longae; bracteolae 4–6 mm. longae; sepala azurea, strigulosa; sepalum superiore late obovatum, 15–16 mm. longum; sepala lateralia oblongo-obovata, 16 mm. longa, apice rotundata; sepala inferiora breviora latioraque; petala azurea, laminae superiores glabrae, integrae, 9 mm. longae, calcaria 15 mm. longa; laminae inferiores obovatae, 8–9 mm. longae, bilobatae; unguis 5 mm. longi; folliculi 3, pubescentes, 11–12 mm. longa; semina alata.

TYPE: Northeastern Bhutan, Me La, Aug. 25, 1934, *Ludlow & Sherriff* 887; holotype (BM); isotype (E).

The proposed species has been collected between 3500 and 4000 m., as follows: open grassy meadows, Me La, Bhutan, *Ludlow & Sherriff* 1016 (BM); Kurmatrang, Pumthang, *Cooper & Bulley* 2239 (E); Cho La, S. E. Tibet to Bhutan, *Ludlow & Sherriff* 873 (BM); Pangotang, Tsampa, *Ludlow & Sherriff* 19686 (BM). Its inflorescence is corymbose, not spicate as in some species of the region, e.g., *D. denudatum* and *D. roylei*.

86. *Delphinium caeruleum* Jacquem. ex Camb. in Jacquem. Voy. Bot. 4: 7. pl. 6. 1843. FIG. 8, H.

Delphinium grandiflorum L. var. *kunawarensis* Brühl in Brühl & King, Ann. Bot. Gard. Calc. 5: 98. 1896. New name for *D. caeruleum*.

? *Delphinium caeruleum* var. *obtusilobum* Brühl ex Huth, Bot. Jahrb. 20: 463. 1895 and *D. grandiflora* var. *obtusiloba* Brühl in Brühl & King, Ann. Bot. Gard. Calc. 5: 99. 1896.

? *Delphinium caeruleum* vars. *corymbosum* Brühl ex Huth and *tenuicaule* Brühl ex Huth, *loc. cit.* 464. 1895 and *D. grandiflorum* var. *tenuicaulis* Brühl in Brühl & King, *loc. cit.* 98. Unfortunately I have been unable to borrow authentic material from the Calcutta Herbarium. Mukerjee (Bull. Bot. Surv. India 2: 293–296. 1960) refers vars. *corymbosum* and *tenuicaule* to *Delphinium candelabrum* Ostenfeld.

? *Delphinium caeruleum* var. *magnificum* Huth, *loc. cit.*

Stem branched from base, 7–40 cm. tall, branches spreading, densely strigulose below, more loosely pubescent above; leaves suborbicular in outline, 1–4 cm. in diameter, 5–7-parted into cuneate-oblong segments, these incised into linear strigulose lobes tending to be revolute on the margin or less divided in the basal leaves; lower petioles to ca. 1 dm. long, not widened at the base, upper cauline leaves remote, shorter petioled; flowers few, in a loose subcorymbose raceme or panicle; bracts divided into linear segments or entire, about 1 cm. long; pedicels 1–5 cm. long; bracteoles fairly remote from flower, pubescent, linear, 5–8 mm. long; sepals pale to intense blue, pubescent to hairy, the upper sepal 12–16 mm. long, ovate, acutish, ca. 9 mm. wide; the spur almost straight, subhorizontal, 18–25 mm. long, 2.5–3 mm. wide at the base, narrowed to an acute apex; lateral sepals oblong, pubescent along the midrib, 13–16 mm. long, 6–8 mm. wide; lower sepals about as long, more pointed and more pubescent; upper petals bluish, slightly oblique, the blade ca. 7 mm. long, en-

tire, narrow to rounded at apex, spur 14–15 mm. long; lower petals blue, the blade oblong-obovate, 7 by 5.5 mm., with a round hairy patch near the base, otherwise sparsely bearded and ciliate, entire or cleft for about 2 mm., the claw 4.5 mm. long; stamens 5–6 mm. long, the anthers dark, 1 mm. long; carpels 3–5, pubescent, 8 mm. or more long, styles an additional 2.5–3 mm.

TYPE: Cambessedes says "Ad jugum montis Houkio (vulgo Houkio-Ghauti) ad fines Tartariae sinensis et provinciae Kanaor (alt. ca. 5000 m.)." At Paris is a specimen "in herboris altissimis inter Hookis Ghat et Doubling, Kunaweer," *Jacquemont* Cat. No. 1896 (P) (720); (K) isotype seen. The Paris specimen has three pieces, two are low, a few cm. high, the third is taller, spindly, 3–4 dm. high; all have lobules 1–2 mm. wide.

DISTRIBUTION. Apparently at 3000 to 5800 m., Nepal, Sikkim, Tibet. I am unable to divide the subcaulescent from the caulescent forms, both growing in the same area. As here recognized, then, a rather variable species in height, pubescence, and outline of lamina of lower petal, which may be entire and rounded to emarginate and rounded.

EXAMPLES. Nepal: *Duthie* 5299; *Lall Dhwoj* 556. Sikkim: *Cave* 6; *Smith & Cave* 2131, 1935; *Cooper* 760. Tibet: *Strachey & Winterbottom* 11, 13; *Ludlow & Sherriff* 10051, 9952, 9751, 779, 11067, 2400, 1977, 1968; *Spencer Chapman* 35; *Kingdon Ward* 9997. Bhutan: *Ludlow, Sherriff & Hicks* 17476.

87. *Delphinium candelabrum* Ostenfeld in Hedin, Southern Tibet 6(3): 80. 1922. (A list of flowering plants from inner Asia collected by Dr. Sven Hedin [compiled by Ostenfeld & Paulsen].) FIG. 8, I.

Low perennial from a slender rootstock arising from a thickened branched elongate root; stem dark, slender, branched or simple, subglabrous or with some spreading hairs, 5–15 cm. high; leaves subrosulate at the base, the lower petioles 2–7 cm. long, very slender, strigulose, dilated at the base; the blades 1–2 cm. in diameter, rounded, palmatisect to the base, then again into oblong-linear segments 1–2 mm. wide, mucronate at the subtruncate apices, rather long-pubescent especially beneath; cauline leaves 1 to few, remote, the upper reduced to trifoliate bracts; flowers about 3 to 6, in an open subcorymbose inflorescence; bracts 5–10 cm. long, simply or compound-laciniate; pedicels arcuate-ascending, very slender, somewhat spreading-villous, 5–10 cm. long; bracteoles entire and linear, to ca. 10 mm. long, 1 mm. wide, or sometimes trilobed, near the middle of the pedicel; sepals blue-purple, sometimes drying brownish, white- or yellow-villous, the upper sepal round-ovate, 20 mm. by 18 mm., the spur often slightly decurved, ca. 20 mm. long, 4 mm. wide at the base; lateral sepals asymmetrically oblong-elliptic, 20–25 mm. long, 13 mm. wide; lower sepals ovate-elliptic, 22 mm. by 15 mm., rounded-apiculate at the tip; upper petals dark violet, quite straight, the lamina ca. 14 mm. long, with a few stiff hairs, rounded and erose at apex, the spur 17 mm. long; lower petals with blade at right angles to the claw, rounded-obovate, 6 mm. by 4.5

mm., unequally 2-lobed, short-bearded on lower half, the claw 6.5 mm. long; stamens glabrous, 7 mm. long; anthers dark, 1 mm. long; carpels 3, hairy.

TYPE: Eastern or Inner Tibet, at 5127 m., Aug. 9, 1901, *Hedin* (s?). Not seen.

ILLUSTRATION. OSTENFELD & PAULSEN, List Fl. Pls. Inner Asia, *pl.* 2. 1922.

SPECIMENS SEEN. Tibet: *Ludlow* 332 (E); Pomo Tso, *Ludlow & Sherriff* 523 (E).

88. *Delphinium chefoense* Franchet, Bull. Soc. Philom. Paris VIII. 5: 170. 1893. FIG. 8, J.

Delphinium gilgianum Pilger ex Gilg & Loesener, Bot. Jahrb. 34. Beibl. 75: 33. 1904. Based on *Zimmermann* 192, May, 1900, from Tsingtau, Kiau-tschou, Schangtung (Shantung), China; isotypes seen (GH, US).

Delphinium grandiflorum L. var. *gilgianum* (Pilger) Finet & Gagnep. Bull. Soc. Bot. France 51: 483. 1905.

Stem 5–8 dm. tall, erect, angled, few leaved, retrorse-strigulose and short pubescent, with some glandular hairs; basal leaves largely withered by anthesis, the petioles 5–15 cm. long, but slightly dilated at the base, the laminae parted to the base with short, linear, obtuse segments; upper cauline leaves short-petioled, the blades rounded in outline, 3–8 cm. broad, minutely pubescent mostly with appressed hairs, trifid, then the 2 lateral lobes deeply cut making the blade essentially 5-fid, the parts cuneate-obovate, incised $1/2$ – $2/3$ their length into lanceolate or linear lobes mostly 2–5 mm. wide; inflorescence laxly racemose, rather few flowered, sometimes with 1 or 2 basal branches, the axis densely spreading-pubescent, some of the hairs glandular; bracts mostly entire, lance-linear, pubescent, 5–7 mm. long; pedicels ascending, slightly divaricate, 2–5 cm. long; bracteoles 2, linear, remote from the flower, 3–4 mm. long; sepals deep blue, with some white, pubescent, the upper sepal broadly ovate, 20–21 mm. by 15–16 mm., subacute, the spur straight, ca. 20 mm. long, 5 mm. wide at the base, obtuse; lateral sepals elliptic, 20 mm. by 12 mm., rounded-obtuse, generally pubescent; lower sepals elliptic-obovate, 20 mm. by 13 mm., obtuse; upper petals pale, somewhat yellowish at apex, the laminae very oblique, ca. 8 mm. by 4 mm., rounded and glabrous at apex or slightly emarginate, the spur ca. 18 mm. long; lower petals bluish, oblique, the lamina rounded-obovate, ca. 9 mm. in diameter, shallowly notched, with yellow beard near the base, otherwise sparsely hairy and ciliate, the claw 5 mm. long; stamens 7–8 mm. long, dilated below, glabrous; anthers dark, oblong, 1.2 mm. long; follicles 3, pubescent; seeds winged on angles.

TYPE: Chefoo, northern China, prov. Shantung, *Fauvel* (P); seen.

ADDITIONAL MATERIAL. Chefoo, *Carmichael* 823 (BM); E. Chungtien, *K. M. Feng* 2714 (A).

89. *Delphinium cheilanthum* Fisch. ex DC. Syst. 1: 352. 1817;
Prodr. 1: 53. 1824. FIG. 8, K.

Delphinium pauciflorum Reichb. ex Schlecht. Linnaea 6: 582. 1831, nomen;
ex Ledeb. Fl. Rossica 1: 61. 1841. Based on "In terra Tschuktschorum, ad
sinum St. Laurentii," *Eschscholtz* (LE). Seen.

Delphinium davuricum Bess. Cat. pl. h. bot. Cremenec. Suppl. 3: 9. 1814,
not Georgi, 1797-1802.

Delphinium dahuricum Stev. ex DC. Prodr. 1: 53. 1824; *pro synonym.*

Delphinium cheilanthum var. *dahuricum* (Steven in DC.) Huth, Bot. Jahrb.
20: 466. 1895.

Delphinium sylvaticum Turcz. Bull. Soc. Nat. Moscou 15: 74. 1842. Type
from Dahuria, *Turczaninow*, Herb. Fischer (LE); seen.

Delphinium parviflorum Turcz. *loc. cit.* 75. Type, "Ad fl. Barguzin, 1834,
Turcz.," (LE); seen.

Delphinium cheilanthum var. *parviflorum* (Turcz.) Huth, Bot. Jahrb. 20:
467. 1895.

Delphinium middendorffii Trautv. Florula taimyrensis phaenogama, in Mid-
dend., Reise Sibiriens 1(2)[Bot.] 63. 1847. Type "Ad. fl. Taimyr, Aug.
1843, *Middendorf*," (LE); seen.

Delphinium cheilanthum ssp. *middendorffii* (Trautv.) P. Brühl in Brühl &
King, Ann. Bot. Gard. Calc. 5: 100. 1896.

? *Delphinium cheilanthum* ssp. *schizophyllum* Brühl, *loc. cit.* Based on a
collection by Davidson on China Hill near Naini Tal. Not seen.

Delphinium cheilanthum var. *subglabrum* Ledeb. ex Huth, Bot. Jahrb. 20:
466. 1895.

Delphinium cheilanthum vars. *laxiflorum* and *chinense* Trautv. ex Huth, *loc.*
cit. 467. These three varieties of Huth are, to me, uncertain.

Delphinium cheilanthum var. *albiflorum* Trautv. Act. Horti. Petrop. 5: 503.
1877. Two sheets bearing this name were loaned from Leningrad, both from
Herb. Fischer. One certainly belongs here, the other doubtfully so.

Perennial from a woody crown; stems 1 to several, 2-9 dm. tall, simple
or branched, subglabrous below to more or less strigulose above, somewhat
ridged, 4-8 mm. thick, rather leafy throughout, the lower petioles to about
1.5 dm. long, slightly dilated at the base, the upper much shorter to almost
sessile; blades rounded-pentagonal in outline, 3-12 cm. broad, from sub-
glabrous to strigulose on upper surface, especially the latter along the
veins, somewhat paler and pilose beneath, 5-parted, or the upper 3-parted,
with cuneate-ob lanceolate or -lanceolate segments, these entire in upper
leaves or trifid or 5-fid in lower into lanceolate acuminate lobes 2-5 mm.
wide; inflorescence racemose, few- to several-flowered, the bracts leaflike,
entire to multifid; pedicels erect or ascending, 1.5-3 cm. long; bracteoles
lanceolate, to ca. 6 mm. long, 2 just beneath the flower, often a third
farther down; sepals rich deep blue, sometimes white, pubescent, the
upper one 12-16 mm. long, ovate, the spur straight or somewhat decurved,
15-20 mm. long, 3-4 mm. wide at base, narrowed to an acute tip; lateral
sepals rhombic-ovate, 12-16 mm. long, 8-9 mm. wide, obtuse, pubescent
along the mid-vein; lower sepals oblong-ovate, 16-20 mm. long, 8-10 mm.
wide, acutish, more generally pubescent; upper petals mostly blue, the
blade slightly oblique, glabrous, entire, 13-16 mm. long, the spur slightly

longer; lower petals mostly blue, the oblong-obovate blade mostly not lobed, ca. 13 mm. by 9 mm., with a small patch of yellow hair near the base; claw broad at summit, 6–7 mm. long; stamens 6–7 mm. long, glabrous; anthers dark, 1.2 mm. long; follicles 3, densely pubescent, 13–15 (–20) mm. long, the styles 2–3 mm. long; seeds winged on the angles.

TYPE: "Hab. in Daouria, circa Doroninsk. *Vlassof.*" Photograph seen (BH); specimens seen (LE).

RANGE. Eastern Siberia and northern Mongolia.

ILLUSTRATIONS. GMELIN, *Fl. Sibirica* 4: 187. *pl.* 76. 1799; *Bot. Reg.* 6: *pl.* 473. 1820.

REPRESENTATIVE SPECIMENS. *Augustinowicz* in 1875; *Ikonnikov-Galitzky* 365, 3335, 3428; *Karo* 188; *Turczaninow* in 1831; *Bunge* in 1883; *Maack* 673.

Huth, *Bot. Jahrb.* 20: 466–467. 1895, lists var. *formosum* Hort., and var. *chauvieri* Lem. (*D. hendersonii* Henfr., *Gard. Mag. Bot.* 2: 57. *pl.* 6. 1850), both of which seem to be entirely horticultural forms.

90. *Delphinium coleopodum* Hand.-Mazz. *Symb. Sinicae* 7: 275. 1931. FIG. 9, A, B.

Stem simple, 2–4 dm. tall, mostly glabrous, leafy in lower half; petioles 5–15 cm. long, dilated at base for 2–3 cm., blades pentagonal, 2–8 cm. broad, somewhat shorter, strigulose or with longer hairs especially beneath, deeply pentafid into cuneate-obovate divisions that are incised to about the middle into several lanceolate acuminate lobes 5–15 mm. long, 2–5 mm. wide; inflorescence mostly a simple few-flowered secund raceme 5–20 cm. tall; bracts setaceous and simple to leafy and 3-lobed, the lower with conspicuous inflated petiole base, the upper often 1 cm. long, purplish; pedicels erect, spreading-hairy near the apex, 3–8 cm. long; bracteoles setose, purplish, 7–12 mm. long, placed near the middle of the pedicel; sepals dark blue, rather long-pubescent, the upper sepal ovate, 20–25 mm. long, 12–14 mm. wide, pointed, the spur horizontal or slightly decurved, 18–25 mm. long, ca. 3 mm. wide at the base, rather slowly narrowed to an often blunt tip; lateral sepals 25–27 mm. by 12–13 mm., obtuse, pubescent along the midrib; lower sepals about as large, but more generally pubescent; upper petals bluish, the blade 11–12 mm. long, slightly oblique, entire, the spur 20–21 mm. long; lower petals blue, the oblong blade ca. 12 mm. by 8 mm., cleft 2.5 mm., with very long hairs near the base, scattered shorter ones elsewhere, claw 6 mm. long; stamens 5–6 mm. long, the filaments somewhat ciliate; anthers dark, 1 mm. long; follicles 3, erect, with long yellow hairs, the body 15–18 mm. by 4–5 mm., the style an additional 3 mm.; seeds ca. 1 mm. long, with a whitish membrane folded into longitudinal wings at the angles.

TYPE: Northwest Yunnan at Likiang, no. 4105, presumably collected by *Handel-Mazzetti* and presumably at (w). Not seen, but it is well illustrated in his *Symbolae Sinicae* 7: *pl.* 5. *fig.* 6. 1931.

RANGE. At about 4000 to 5000 m., in the Likiang or Lichiang Snow Range of Yunnan.

REPRESENTATIVE SPECIMENS. *Rock* 10777, 11676, 7761, 6110, 10633, 11688, 10764, 24945, 11436, 7765, 10669, 6092, 24738; *Forrest* 6690, 22471, 22483, 22362, 3035, 11363, 16942, 15198, 15173; *C. Schneider* 3029.

This is one of the most easily differentiated species from western China with its remarkably inflated petiole bases.

91. *Delphinium crispulum* Rupr. Fl. Cauc. 34. 1869. FIG. 8, L.

Delphinium speciosum var. *linearilobum* Trautv. Acta Horti Petrop. 4: 102. 1886. Based on "Transcaucasia rossica districtu Achalzich, ad lacum Chosapin, 6000', *G. Radde* 212, Aug. 19, 1874" (LE); seen.

Delphinium linearilobum (Trautv.) N. Busch in Fl. Cauc. Crit. III. 3: 68. 1902.

Delphinium triste var. *linearilobum* Huth, Bot. Jahrb. 20: 413. 1895.

Delphinium linearilobum var. *crispulum* N. Busch in Fl. Cauc. Crit. III. 3: 68. 1902.

Delphinium tomentellum Busch, loc. cit. 70. Type, Baku, district Kuba, Mt. Bazar, *Alexsenko* 2620 (LE); seen, also photo. (A, K).

Delphinium tomentellum vars. *macranthum* and *araraticum* N. Busch, loc. cit. 70, 71.

Delphinium araraticum (Busch) Busch in Davis, Fl. Turkey 1: 111. 1965.

Delphinium tomentellum var. *angustibracteatum* Busch, Fl. Cauc. Crit. III. 3: 70. 1902.

Perennial from a woody rootstock; stem 4–7 dm. tall, angled, cinereously finely strigulose throughout, leafy to inflorescence, branched above; leaves rather crowded, petioles dilated at base, the lower 1–2 dm. long, the upper shorter; leaf blades strigose above and beneath, 5–10 cm. long, 5-parted almost to base into narrow segments which are in turn deeply incised into lance-linear lobes 5–25 mm. long, prominently veined; upper leaves tripartite; inflorescence an open panicle, the central raceme densely many flowered, the lateral more lax and few flowered; bracts strigose, linear to lanceolate, 1–2 cm. long; pedicels 1–4 cm. long, ascending; bracteoles strigose, 5–7 mm. long, linear, subtending the flower; sepals light blue, strigose, upper sepal ovate, 13–15 mm. by 5 mm., pointed, the spur almost straight, 14 mm. long, 3 mm. wide at the base, rather narrow at apex; lateral sepals oblong-obovate, 15 mm. by 8 mm., rounded-obtuse; lower sepals 15 mm. by 5 mm., pointed; petals very dark, the upper with a blunt, almost straight, somewhat bidentate, glabrous lamina ca. 10 mm. long, the spur ca. 12 mm. long; lower petals with the blade oblong, bearded, 4 mm. by 2.5 mm., cleft 1/3 its length, the claw 6 mm. long, the blade at right angles to the claw; stamens 6–7 mm. long, with glabrous filaments; anthers dark, oblong, 1 mm. long; follicles 3, pubescent; seeds squamellate.

TYPE: Caucasus orientalis, Gumbet, *Owerin*, July 26, 1861 (LE), seen; photograph (A, K).

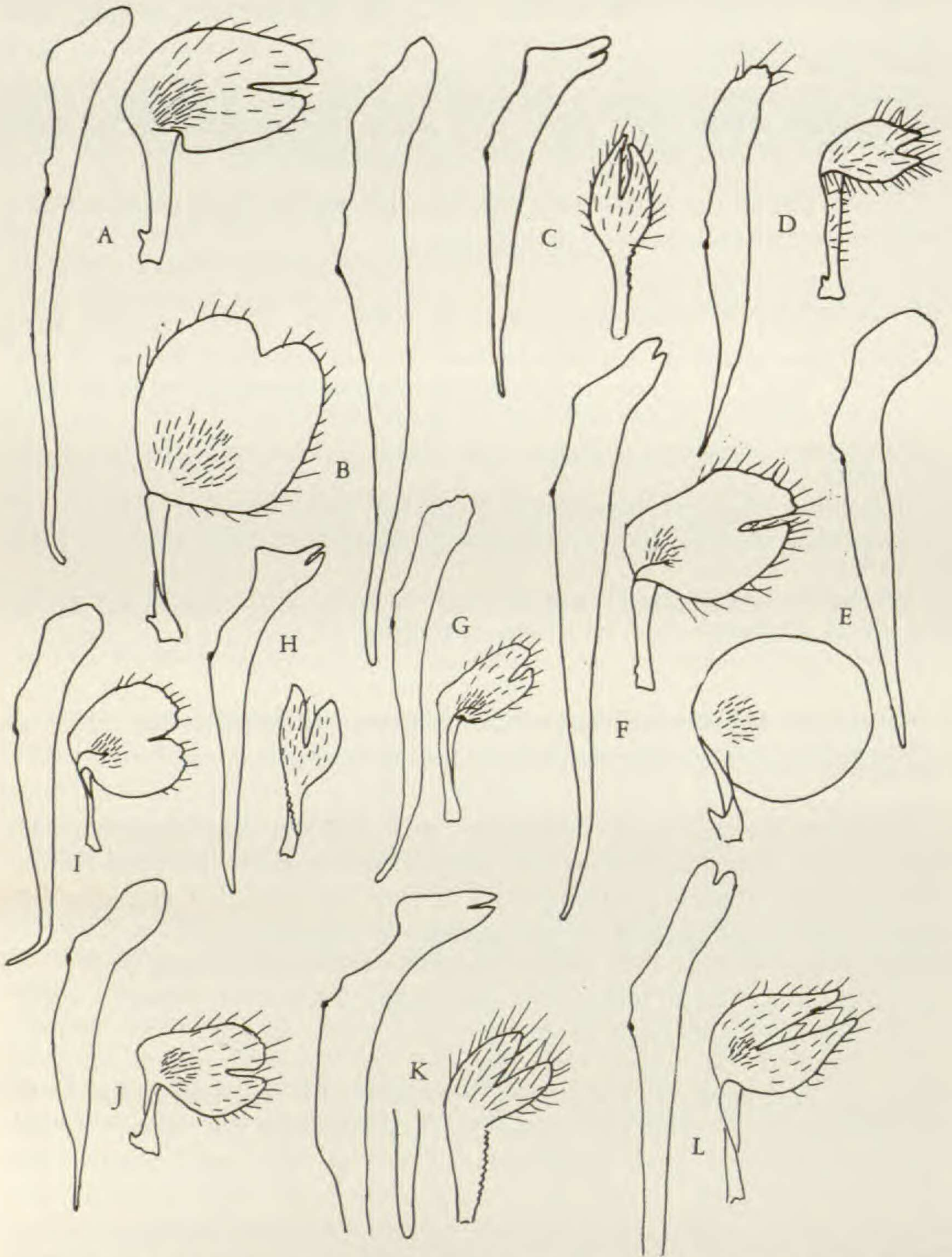


FIGURE 9. *Delphinium*, GROUP VI. Petals, the upper spurred, the lower clawed. A. *D. coleopodum*; blade of upper petal 12 mm. long, spur 21 mm.; blade of lower petal 12 mm. long, claw 6 mm.; drawn from *Rock 11676* (US). B. *D. coleopodum*; blade of upper petal 13 mm. long, spur 23 mm.; blade of lower petal 13 mm. long, claw 8 mm.; drawn from *Rock 10764* (US). C. *D. denudatum*; blade of upper petal 9 mm. long, spur 15 mm.; blade of lower petal 6 mm. long, claw 5 mm.; drawn from *Fleming 445* (MICH). D. *D. dissectum*; blade of upper petal 11 mm. long, spur 13 mm.; blade of lower petal 6 mm. long, claw 6 mm.; drawn from *Pavlov 336* (NY). E. *D. grandiflorum*; blade of upper petal 10 mm. long, spur 18 mm.; blade of lower petal 10 mm. long, claw 4 mm.; drawn from *Nikiforow* (MICH). F. *D. henryi*; blade of upper petal

DISTRIBUTION. The plants seem to grow in rocky places between 1000 and 3000 m., from eastern Anatolia to the Caucasus and northwestern Iran.

EXAMPLES. Transcaucasia: prov. Tiflis, *Grossheim* 305. Turkey: prov. Kars, *Davis* 32562 in part; Turkish Armenia: *Sintenis* 7107 and 7108; prov. Van, *Davis* 23327, 23612; *McNeill* 731; prov. Erzincan, *Davis* 31665; prov. Coruh, *Davis* 32443. Iran: above Zinjanab, *Gilliat-Smith* 2514.

Nevski (Komarov, Fl. U.S.S.R. 7: 143. 1937) cites the synonymy much as I have given it, but Davis (Fl. Turkey 1: 110–111. 1965) maintains *D. linearilobum* and *D. araraticum* as species, as well as *D. tomentellum* and *D. crispulum*, making 4 distinct species. The differences seem very slight; *D. araraticum*, for instance, having bractlets 2–3 mm. wide, while in the others they are 1–2 mm. Without more material than was available to me I cannot be sure of the status of the taxa and follow Nevski.

92. *Delphinium denudatum* Wall. Cat. no. 4719. 1830, *nomen*; ex Hook. f. & Thoms. Fl. Indica 49. 1855. FIG. 9, C.

Delphinium pauciflorum Royle, Illustr. Bot. Himal. 55. 1834, not D. Don, Prodr. Fl. Nepal. 196. 1825.

Stem usually freely and openly branched throughout, 4–8 dm. tall, subglabrous to rather coarsely strigose, especially above, 2–4 mm. thick, terete, sometimes spreading-pubescent above; basal leaves 5–15 cm. broad, roundish in outline, 3–5-parted into rather broad, obovate divisions that are pinnately and divaricately coarsely laciniate into suboblong lobes or teeth 2–3 mm. wide, the petioles to 1.5 dm. long, slender, somewhat dilated at the base; cauline leaves remote, gradually reduced upward and more deeply laciniate into narrower lobes; inflorescence an open panicle of rather few-flowered open racemes; bracts linear, commonly 5–15 mm. long; pedicels ascending, 1–4 cm. long; bracteoles 2, commonly near the middle of the pedicel, 2–4 mm. long; flowers fragrant; sepals blue to violet, the upper sepal ovate, 12–13 mm. by 6–7 mm., acute, pubescent, the spur 14–15 mm. long, 3.5 mm. wide at the base, subacute; lateral sepals oblong-ovate, 13 mm. by 7–8 mm., rounded at apex, pubescent on

10 mm. long, spur 25 mm.; blade of lower petal 11 mm. long, claw 5 mm.; drawn from *Henry* 6952 (GH). G. *D. incisum*; blade of upper petal 9 mm. long, spur 16 mm.; blade of lower petal 6 mm. long, claw 6 mm.; drawn from *Dhwoj* 49 (E). H. *D. koelzii*; blade of upper petal 9 mm. long, spur 13 mm.; blade of lower petal 5 mm. long, claw 5 mm.; drawn from *Koelz* 4921 (MICH). I. *D. kamaonense*; blade of upper petal 8 mm. long, spur 14 mm.; blade of lower petal 7 mm. long, claw 5 mm. long; drawn from *Ludlow* 781 (E). J. *D. kamaonense*; blade of upper petal 7 mm. long, spur 15 mm.; blade of lower petal 7 mm. long, claw 4.5 mm.; drawn from *Duthie* 5299 (MICH). K. *D. lanigerum*; blade of upper petal 11 mm. long, spur 18 mm.; blade of lower petal 6 mm. long, claw 6 mm.; drawn from *Kotschy* 430 (MO). L. *D. malacophyllum*; blade of upper petal 11 mm. long, spur 28 mm.; blade of lower petal 8 mm. long, claw 7 mm.; drawn from *Harry Smith* 3385 (BM).

midline; lower sepals oblong-ovate, 14–15 mm. by 7 mm., rounded at apex, pubescent; upper petals white, with blue tinge at apex, the blade 8–9 mm. long, glabrous, bidentate, oblique, the spur 13–15 mm. long; lower petals blue or violet, the claw 5 mm., the broadly elliptical blade bearded, ca. 6 mm. long, cleft almost halfway; stamens somewhat violet, glabrous, 5–6 mm. long; anthers bluish, 0.8 mm. long; follicles 3, sparsely strigose to subglabrous, 10–16 mm. by 3–3.5 mm., the styles an additional 2–3 mm.; seed dark, obpyramidal, 1 mm. long, the scales rather long and not regularly arranged in even rows.

TYPE: Baramula, Kashmir, *Winterbottom* 348, isotype (K); seen.

RANGE. About 1600 m. to 3300 m., Himalaya of northern India, Kashmir and West Pakistan.

ILLUSTRATIONS. COLLETT, *Fl. Simlensis* 12. 1902; BASU, *Indian Medicinal Plants*, pl. 7. 1918; BLATTER, *Beautiful Flowers Kashmir* 1: pl. 4. 1927; COVENTRY, *Wild Flowers Kashmir* 3: pl. 7. 1930.

REPRESENTATIVE COLLECTIONS. Punjab: *Koelz* 3163, 4963, 1944, 4638, 4841, 8344; *R. Stewart* 6042, 2026 1/2; *Sherriff* 7310; *Lace* 164; *Duthie* 8–21–1897, 5–25–1897. Pradish: *Koelz* 21113, 8659; *Jacquemont* 535, 721; *Fleming* 445, 394; *Sahni* 24608; *Dudgeon & Kenoyer* 107; *Strachey & Winterbottom* 3; *Watt* 612; *Hooker & Thomson*, June 11, 1848. Kashmir: *Pinfold* 164; *Ludlow & Sherriff* 7671, 8106, 9106; *Dickason* 366; *Stewart* 17468, 9268, 17534, 12147, 19440.

93. *Delphinium dissectum* Huth, *Bot. Jahrb.* 20: 403. 1895. FIG. 9, D.

Stem erect, simple, 2.5–5 dm. tall, strigulose throughout, scattered-leafy to the middle, the lower petioles 5–12 cm. long, dilated at base, strigulose, the upper gradually shorter; leaf blades rounded-pentagonal in outline, the lower 5–10 cm. broad, strigulose on both surfaces, parted almost to the base into narrow-cuneate segments, these much broadened above, deeply pinnately incised and laciniate into linear segments mostly 1.5–2.5 mm. wide; raceme elongate, peduncled, 1–3 dm. long, soft-pubescent, rather laxly flowered; lower bracts laciniate, upper entire, linear-lanceolate, ca. 1 cm. long; pedicels divaricate, mostly 1–3 cm. long; bracteoles lanceolate, 4–6 mm. long, subtending the flower; sepals dilute blue, with slender hairs 1 mm. long, both externally and internally; upper sepal ovate, 16–18 mm. by 10 mm., acutish, the spur stout, decurved, 16–17 mm. long, 4 mm. wide at base, blunt at tip; lateral sepals oblong-elliptic, 18–20 mm. by 8–10 mm.; lower lance-ovate, 20–22 mm. long, 9 mm. wide, subobtuse; petals black, the upper setose at entire tip, the spur 13 mm. long; lower petals oblique, the blade 6 mm. by 3 mm., the 2 lobes gaping, ciliate, 2 mm. long, bearded, the claw 6.5 mm. long; stamens 6–7 mm. long, glabrous; anthers dark, 1 mm. long; follicles 3, more or less pubescent.

TYPE: Mongolia between Tschargachantu and Geltgentei, *Kirilov*, 1841 (LE); seen.

COLLECTIONS SEEN. All from Mongolia: *Ikonnikov-Galitzky* 785; *Pavlov* 336; *Krascheninnikov* 87.

94. *Delphinium dolichocentroides* W. T. Wang, Acta Bot. Sinica 10: 159-160. 1962.

Stems 3-5 dm. high, 2.5 mm. thick at base, white-hirsute below, glabrous above, remotely 1-2-foliolate; basal leaves 2-3, long petioled; blades broadly pentagonal, 2.5-5.5 cm. long, 4.5-8 cm. wide, cordate, 3-parted to 1.5-3.5 cm. above the base, the middle part broadly rhombic, cuneate at base, 3-parted to below the middle, the middle lobe broadly or narrowly rhombic, trifid to middle, the lobules linear to lanceolate, 3-5 mm. wide, rarely 1-toothed, the lateral lobes broadly obliquely rhombic, smaller, unequally 2-3-fid; lateral parts broadly obliquely flabellate, unequally 2-parted to base, the upper parts like the middle, the lower broadly rhombic, unequally bifid, densely strigulose beneath, loosely hirsute above; petioles 14-17 cm. long, loosely hirsute, narrowly vaginate at base; upper leaves with few long lacinate entire segments 3-4 cm. long, 5 mm. wide; racemes 5-24 cm. long, glabrous, very open, 3-6-flowered; pedicels 2-8 cm. long, bibracteolate near or above the middle; bracteoles linear, 6-14 mm. long, 0.4-1 mm. wide, loosely puberulous; sepals blue-purple, elliptic-obovate, 14-16 mm. long, appressed puberulent, short-corniculate, these tips 1-1.5 mm. long; spur subulate, 27-28 mm. long, 4.2 mm. wide at base, slightly falcate decurved; upper petals flavescent, glabrous, emarginate; lower petals blue, the limb broad-elliptic, bilobulate, long-ciliate, yellow bearded below the middle, about as long as its exappendiculate claw; stamens glabrous; carpels 3, densely pilose.

TYPE: Szechwan, Muli, Aug. 19, 1937, *T. T. Yü 14008* (PE), not seen; photograph (E), seen.

I have had no material for study. *Delphinium dolichocentroides* was said by the author to differ from *D. dolichocentrum* in its simple hirsute stems, few-flowered racemes, emarginate upper petals; to have the habit of *D. yuanum*, but with the spurs longer than the sepals and decurved; to be near *D. taliense*, but with leaves 3-parted to the base and the parts more deeply divided.

95. *Delphinium grandiflorum* L. Sp. Pl. 1: 531. 1753. FIG. 9, E.

Delphinium grandiflorum var. *linnaei* Brühl & King, Ann. Bot. Gard. Calc. 5: 98. 1896.

Delphinium chinense Fisch. Cat. Hort. Gorenk. 1808; Lodd. Bot. Cab. 1: pl. 71. 1817.

Delphinium grandiflorum var. *chinense* Fisch. ex DC. Prodr. 1: 53. 1824.

Delphinium grandiflorum vars. *bhotanica*, *paradoxa*, *setchwanensis* and *tsangensis* Brühl in Brühl & King, Ann. Bot. Gard. Calc. 5: 98, 99. 1896. I have been unable to borrow authentic material.

Delphinium sinense Fisch. ex Link, Enum. Hort. Berol. 2: 80. 1822.

Delphinium pubiflorum Turcz. Fl. Baic.-Dahur. 73. 1842, *nomen*.

Delphinium grandiflorum var. *pubiflorum* Turcz. *loc. cit.* I have had on loan the following material from Leningrad: "In arenosis ad Baicalem prope Turxam, 1829, Turcz." as "pubiflorum mihi" 2 sheets; and "In arenosis ad

ripam Baicalis, prope Turxam, 1823, Turcz. mihi." I take these to be authentic material.

Delphinium grandiflorum var. *acaule* Turcz. ex Huth, Bot. Jahrb. 20: 461. 1895. A sheet "Ad acidulas Pogromezenses 1829, Turcz." as var. *acaule* (LE) seen. The stems were 1-5 dm. tall, very fine-leaved.

Delphinium grandiflorum var. *gmelinii* Rchb. Ill. Aconit. atque Delph. pl. 12. 1823-27. A sheet from (LE) seen, from N. T. Siberia.

Delphinium grandiflorum L. var. *pallidum* Huth, Bot. Jahrb. 20: 461. 1895, described as having white flowers; may belong here.

Delphinium grandiflorum var. *pumilum* Huth, loc. cit. as being about 2 dm. high; may belong here.

Delphinium grandiflorum var. *tigridium* Kitagawa, Rep. 1st Sci. Exp. Manch., Sect. 4, IV: 17, 83. pl. 2. 1936. Reduced to synonymy by W. T. Wang, Acta Bot. Sinica 10: 271. 1962.

Delphinium grandiflorum var. *majus* W. T. Wang, loc. cit. 273. Said to have unusually large leaves. Based on *Feng 9286* from Yunnan, which I have not seen.

Delphinium grandiflorum var. *leiocarpum* W. T. Wang, loc. cit. 274. Based on *K. C. Fu 7900* (which I have not seen), with glabrous carpels.

Delphinium grandiflorum var. *glandulosum* W. T. Wang, loc. cit. 272. 1962. The type by *S. T. Wang*, May 2, 1928, from Shensi is not available.

Delphinium virgatum Jacq. ex Sprengel, Syst. 2: 617. 1825; not *D. virgatum* Poir. Encycl. Suppl. 2: 458. 1811.

Delphinium fangshanense W. T. Wang, Acta Bot. Sinica 10: 269, 270. 1962. Based on *T. N. Liou 8258* which has not been available to me.

Stem or stems mostly slender, 2-8 dm. tall (although some forms are semiprostrate), simple or branched above, mostly closely strigulose, more densely so in the inflorescence, leafy, the cauline leaves not crowded, gradually reduced upward; petioles scarcely dilated at the base, slender, the lower to 1.5 dm. long, the uppermost nearly or quite lacking; leaf blades palmately multipartite, 3-10 cm. wide, the segments divided into parts that are in turn lacinate into linear lobes mostly 1-2 mm. wide and up to 2 cm. or more long; inflorescence simple or few branched, the flowers from 1-2 on a branch to several in rather a dense raceme; lower bracts lacinate, 1-3 cm. long, the upper entire, linear, to 1 cm. long; pedicels erect or ascending, strigulose, 2-4 cm. long; bracteoles linear, opposite; sepals mostly deep blue, sometimes albino, strigulose to spreading-hairy, the upper ovate, 12-17 mm. by 6-8 mm., obtuse, the spur straight, horizontal, ca. 18 mm. long, 3 mm. wide at the base, gradually tapered; upper petals pale with slight bluish tinge, the limb almost straight, 8-10 mm. long, subentire or emarginate at the rounded apex, glabrous, the spur 16-18 mm. long; lower petals violet blue, the blade yellow bearded at the center, ciliate or not on margins, almost round in shape, 8-10 mm. in diameter, entire, erose or emarginate, the claw 4-4.5 mm. long; stamens 5-6 mm. long, glabrous or nearly so; anthers dark, 1 mm. long; follicles 3, straight or recurved, hairy or puberulent for most part, 10-16 mm. long, 3.5-4 mm. wide; styles an additional 2.5 mm.; seeds 1 mm. long, with a loose membranous envelope folded into wings.

TYPE: "Habitat in Siberia"; photograph seen of specimen (LINN).

RANGE. Central to western Siberia, Inner and Outer Mongolia, northern China (mostly Hopei, Shansi, Kansu).

ILLUSTRATIONS. GMELIN, *Fl. Sibirica* 4: *pl.* 78. 1769; *Bot. Mag. pl.* 1686. 1815.

EXAMPLES SEEN. **Siberia:** *Sokolow* 97; *Maximowicz* in 1859; *Stukow* 1358; *Tugarinowa*, July 13, 1908; *Ehnberg*, July 19, 1900; *Digby*, 1914; *Nikiforow*, July 10, 1917; *Herb. Ledebour* 809; *Herb. Pallas*, Aug. 1877. **Mongolia:** *Karo* 207; *Prescott* in 1830; *Ohwi* 10662; *Hsia* 3159; *Kozlov* 240; *Ikonnikov-Galitzky* 210; 314a; *Litvinov* 490, 989; *Dorsett & Dorsett* 3367. **Tibet:** *Ludlow & Sheriff* 9814, 9073, 11114; *Rock* 13361. **Shansi:** *Licent* 1305; *K. Ling* 9143; *Han Ngan* 92; *H. Smith* 6526, 8150, 7139. **Hopei:** *Dorsett & Morse* 7051; *Liou* 1405; *Read* 746; *Liu* 1433, 1968; *Breitschneider* 1817; *H. Smith* 173, 468, 1163; *T. F. King* 12689; *C. F. Li* 10707; *F. N. Meyer* 1057.

There is great variation in flower size and color, and pubescence, as well as in foliage, the ultimate laciniae of the leaves tending to be wider in Chinese plants than in Siberian and Mongolian. However, a careful study of the matter did not make recognition of the var. *chinense* seem worth while. The species has been widely cultivated and I have seen in herbaria specimens that I would consider *D. grandiflorum* bearing the labels *tatsienense*, *sinense album*, *chinense*, *chinense azureum*, *grandiflorum*, *sibiricum*, *grandiflorum* 'Blue Mirror,' 'Blue Butterfly' and 'Farquahar's Victory.'

96. *Delphinium henryi* Franchet, *Bull. Soc. Philom. Paris* VIII. 5: 177. 1893. FIG. 9, F.

Delphinium henryi f. *concolor* W. T. Wang, *Acta Sinica Bot.* 10: 79. 1962.

Perennial from a very slender rhizome; stem 1–3.5 dm. high, retrorse-strigulose and with long hairs near the nodes, leafy throughout, the leaves only gradually reduced up the stem; petioles somewhat dilated at their base, more or less pubescent, the lower to 10 cm. long, the upper almost lacking; laminae broader than long, somewhat pentagonal in outline, more or less pubescent with rather long appressed hairs, 2–5 cm. broad, 3- to 5-parted almost to base, the segments cuneate at base, deeply cut into few lance-linear lobes 2–3 mm. wide and acute; flowers solitary to few in a subumbellate cluster; bracts largely foliaceous, divided; pedicels retrorse-pubescent, 2–3 cm. long; bracteoles narrow-elliptic, 5–10 mm. long, close to the flower; sepals blue, pubescent; upper sepal 16–20 mm. long, 10–12 mm. wide, ovate, pointed, the spur 25 or more mm. long; lateral sepals oblong-ovate, obtuse, 15–20 mm. long, 8–9 mm. wide, pubescent along the middle; lower sepals 20–22 mm. long, 8–10 mm. wide, acutish-corniculate; petals brownish, with dark dots, the upper petals with a lamina 10 mm. long, very slightly oblique, bidentate, the spur ca. 25 mm. long; lower petals with claw 5 mm. long, lamina oblong-obovate, 11 mm. by 6.5 mm., cleft 4 mm., bearded somewhat at base and ciliate; stamens ca. 7 mm.

long, ciliate; anthers dark, oblong, 1.2 mm. long; follicles 3, silky, suberect, divergent at tips.

TYPE: Central China, Hupeh, *Dr. Henry 6952* (P); seen. Isotypes (BM, E, GH, K, NY), seen. The collection number was published as 6932, but the sheets cited above are all 6952.

OTHER COLLECTIONS. Szechwan: *Henry 6952A*; *K. H. Yang 65383*. Chensi: *Licent 2760*; *Giraldi* in 1897. Two sheets from Szechwan labeled *sutchuense* fide Wang, do not fit the description. These are nearer to *D. henryi* but with a more open habit: *Chu 3807* (E) and *3127* (E).

97. *Delphinium incisum* Wall. Cat. 4717. 1828, *nomen*. FIG. 9, G.

Delphinium ranunculifolium Wall. var. *incisum* Hook. f. & Thoms. Fl. Indica 1: 51. 1855.

Delphinium elatum L. var. *incisum* Hook. f. & Thoms. Fl. Brit. India 1: 26. 1872.

Delphinium englerianum Huth var. *incisum* Huth, Bot. Jahrb. 20: 418. 1895.

To about 1 m. tall, the stem loosely retrorse-pilose, slender, more or less angled, remotely leafy, becoming more retrorse-strigose above, not glandular; cauline leaves pentagonal, the lamina 5–10 cm. wide, somewhat strigose on both surfaces and paler beneath, 5-fid to near the base, the segments somewhat rhombic, 3-lobed to below the middle, then incised into rather few lance-oblong lobules to ca. 1 cm. long and 1.5–3 mm. wide, mucronate; petioles not strongly vaginate, to ca. 1 dm. long, the uppermost leaves almost sessile; inflorescence racemose or few branched, each branch rather few flowered, fairly compact; bracts leafy and dissected or the upper entire, linear-oblong, to ca. 8 mm. long; pedicels erect-ascending, strigose, mostly 1–2 cm. long; bracteoles linear-oblong, strigose, 4–6 mm. long; sepals bluish, strigose, the upper sepal ovate, 14–15 mm. long, 11–12 mm. wide, rounded at apex, the spur spreading decurved, ca. 17 mm. long, 2.5–3 mm. wide at base, blunt; lateral sepals rounded-obovate, 13 mm. long, 12 mm. wide; lower sepals 13 mm. by 7 mm., subacute; petals black, the upper laminae slightly oblique, 9 mm. by 2 mm., entire, glabrous, the spurs 16 mm. long; lower petals with oblong laminae, 6 mm. by 3 mm., with 2 short unequal oblong ciliate lobes and some bearding from the base out, the claw 6 mm. long; stamens 6–7 mm. long, glabrous; anthers dark, 1 mm. long, oblong; carpels 3, densely pubescent.

TYPE: Kamaon (Kumaun), *Dr. Wallich*, List No. 4717, isotypes (BM, E, K, NY, P); seen.

COLLECTIONS SEEN. Nepal: *Nilo Bi Rh no. 21* (E); *Lall Dhwoj 49* (E), 267 (E).

Near *D. himalayae*, but inflorescence more branched; flowers smaller; upper petals glabrous and entire.

98. *Delphinium kamaonense* Huth, Bull. Herb. Boiss. 1: 333. 1893.
Spelled *camaonense* in Huth, Bot. Jahrb. 20: 460. 1895. FIG. 9, I, J.
Delphinium grandiflorum L. var. *kumaonense* E. Huth ex Brühl & King, Ann.
Bot. Gard. Calc. 5: 98. 1896.

Perennial from a thick subvertical root; stem branched, 1–5 dm. tall, subglabrous or with some spreading hairs; petioles dilated at the base, the lower 3–8 cm. long; lower leaves pubescent especially beneath, strigulose above, the blades 2–4 cm. across, 5-parted, then 5-fid, the segments cuneate or narrower, laciniate into oblong lobes 2–3 mm. wide, or shallowly lobed with broader divisions; upper leaves with linear lobes 1–2 cm. long, 1–1.5 mm. wide; inflorescence open, divaricately branched; lower bracts tripartite with linear lobes; upper bracts entire, linear, to 1 cm. long; pedicels much longer than flowers, bibracteolate above the middle; bracteoles linear, 3–5 mm. long; flowers deep blue; sepals slightly pilose, to 20 mm. long, with a dark brown subapical spot; upper sepal round-ovate, obtuse, 17 mm. by 12 mm., the spur straight or slightly curved, 12–15 mm. long, 3.5 mm. wide at the base; lateral sepals elliptic-oblong, rounded at apex, 13–14 mm. long, 8–9 mm. wide, lower sepals 14 mm. by 7 mm., oblong-ovate; upper petals dilute brown, the laminae somewhat oblique, 8 mm. long, 3 mm. wide, entire, glabrous, the spurs 14 mm. long; lower petals blue, bifid, yellow bearded, obovate rounded, 7 mm. long, 8 mm. wide, the claw 5 mm. long; stamens 5–6 mm. long, glabrous; anthers dark, 1 mm. long; follicles densely pilose.

TYPE: N. W. India, Kamaon (Kumaun), Nipshany Valley in Darma, 4300–4600 m., *Duthie* in 1884 (probably ♂), not seen; isotypes (E, K), seen; they are numbered 2675, Aug. 31, 1884.

RANGE. Growing at perhaps 3000 to 4500 m., Kumaun, Nepal.

REPRESENTATIVE COLLECTIONS. Kumaun: *Duthie* 5299; *Ludlow* 781, 775. Nepal: *F. M. Bailey* in 1936; *Arnold* 12; *Stainton, Sykes & Williams* 1871, 7216, 2026, 2233, 2200, 7351, 1930, 8035, 7742, 8142; *Tyson* 95; *Polunin* 1576; *Lowndes* 1324, 1229.

99. *Delphinium kantzeense* W. T. Wang, Acta Bot. Sinica 10: 161. 1962.

Stem ca. 1 m. tall, 5 mm. thick near base, loosely spreading-hirtellous, branched, equally foliate; median leaves with broadly pentagonal blade, ca. 5.5 cm. long, 7.5 cm. wide, cordate at base, 3-parted to 3–4 mm. above the base, the primary middle parts broadly rhombic, narrow-cuneate at base, 3-parted to below the middle, secondary middle parts narrow-rhombic, trifid to middle into deltoid or lanceolate lobes 2.5–3.5 mm. wide, the secondary laterals lance-ovate, one-lobulate or entire, the primary lateral parts broadly obliquely obovate, 2-parted to 8–9 mm. above the base, upper secondary parts obliquely rhombic, 3-fid, the lower secondary smaller, unequally bifid, loosely strigulose beneath, loosely hirtellous on veins above; petioles slightly longer than blades, not vaginate; racemes

terminal, the central ca. 14-flowered, lateral 3–5-flowered, lax; lower bracts trifid, others linear, 5–12 mm. long; pedicels 2–5 cm. long, retrorse-strigulose and yellow-glandular-puberulent, divergent, bracteolate above; bracteoles to 2–3 mm. from base of flowers, linear, 4–9 mm. long, 0.3 mm. wide; sepals ashy-blue, oblong-ovate or narrow-elliptic, 10–11 mm. long, puberulent; spur 16–18 mm. long, subulate, 2–2.5 mm. wide at base, decurved to a right angle; upper petals ashy-blue, glabrous, entire; lower petals ashy-blue, the laminae ovate or elliptic-ovate, rounded at apex, entire to emarginate, ciliate, yellow bearded at base, claw slightly longer, appendiculate; stamens glabrous; carpels 3, glabrous.

TYPE: Kantze, July 8, 1951, *Y. W. Tsui 4303* (presumably PE); not seen.

I have seen no material definitely referable here. The species was described as near *D. yunnanense*, but the pedicels spreading puberulent; spur strongly decurved; carpels glabrous.

100. *Delphinium koelzii* Munz, sp. nov.

FIG. 9, H.

Stem slender, 1.5–3 mm. thick, 8–10 dm. tall, strigulose, simple or with a few short branches above; lower leaves mostly withered by anthesis, the blades commonly 2–8 cm. long, less broad, multisect into divisions that are pinnately and divaricately laciniate into lobes 1–2 mm. wide, subglabrous above, somewhat strigulose beneath, but not strongly bicolored, the petioles to 5 cm. long, with dilated base; middle cauline leaves several, short-petioled to sessile; racemes lax, the terminal to 8-flowered, the lateral with fewer flowers; axis, pedicels, etc., densely and finely strigulose; bracts linear, subsetaceous, to 5 mm. long; pedicels divergent with more or less recurved tip, mostly 1–2 cm. long; bracteoles 2–3 mm. long, below the middle of the pedicel; sepals wine-colored to blue, somewhat strigulose, the upper sepal ovate, 10 mm. by 5 mm., obtuse, the spur 13 mm. by 3 mm., straight, rather blunt; lateral sepals 10 mm. by 6 mm., rounded-oblong; lower sepals rounded, 10–11 mm. by 6 mm.; upper petals pale, oblique, the laminae 8–9 mm. long, shallowly toothed at apex, the spur ca. 13 mm. long; lower petals with laminae 5 mm. long, bearded, subovate, divided for ca. 3 mm., the claw 5 mm. long; stamens 5–6 mm. long, glabrous; anthers dark, 0.8 mm. long; follicles 3, densely strigulose.

Caulis tenuis, 8–10 dm. altus, strigulosus; folia infima marcescentia, laminis 2–8 cm. longis, multifidis, cum laciniis ultimis 1–2 mm. latis; inflorescentia subcorymbosa, racemis laxis; bracteae lineares, 3–5 mm. longae; pedicelli divergentes, 1–2 cm. longi; bracteolae 3–5 mm. longae; sepala vinacea aut azurea, strigulosa, 10–13 mm. longa, calcare 13 mm. longo; laminae petalorum superiorum obliquae, 9 mm. longae, bidentatae; laminae petalorum inferiorum 5 mm. longae, lobatae; stamina glabra; carpella 3, dense strigulosa.

TYPE: Punjab, at Kulu, Kangra, at 1600 m., June, 1933, *W. Koelz 4922* (GH); isotypes (F, MICH, NY, US) seen.

OTHER Punjab COLLECTIONS are Kulu, Kangra, *Koelz 4921* (MICH, US) and *4757* (MICH).

The species seems near *D. roylei*, but has a more corymbose inflorescence and smaller flowers.

101. *Delphinium lanigerum* Boiss. & Hohen. in Boiss. Diagn. 8: 10. 1849. FIG. 9, K.

Perennial from a thickened root, the stem 1–2 m. tall, terete, glabrous, sparsely branched above; lower leaves to 2 dm. across, palmately parted almost to base, the parts divided into broadly lanceolate, acute, elongate lobes 8–10 mm. wide, the petioles to ca. 2 dm. long, dilate-vaginate; upper cauline leaves remote, divided into much narrower lobes; racemes short, lax, few flowered, glabrous; bracts linear, 5–10 mm. long; pedicels slender, spreading, 2–3.5 cm. long; bracteoles near the middle of the pedicels, setaceous, 4–5 mm. long; flowers intense blue; sepals glabrous except for the ciliate apex; upper sepal 12–15 mm. long, 5 mm. wide, ovate, acute, the spur 15–18 mm. long, 4 mm. wide at base, horizontal, almost straight, gradually narrowed to the tip; lateral sepals 12 mm. by 4 mm., oblong, somewhat rounded at apex; lower sepals 13 mm. by 5 mm., elliptic-ovate, acute; upper petals obliquely truncate, the blade ca. 11 mm. long, divided at apex for ca. 1.5 mm., glabrous, the spur 22 mm. long; lower petals 12 mm. long, the claw 6 mm., the blade 6–7 mm. long, divided ca. 4 mm., heavily bearded; stamens 6–7 mm. long, glabrous; anthers dark, almost 1 mm. long; follicles 3, pubescent.

TYPE: Mt. Elbrus, northern Iran, *Kotschy 430*, July 1, 1843; isotypes (BM, MO, P), seen.

Said to be frequent in Dudera valley, Mt. Elbrus. A collection from a wet meadow, Dorud, Luristan, Iran, June 9, 1941, *Koelz 18164* belongs here.

102. *Delphinium malacophyllum* Hand.-Mazz. Acta Horti Gothob. 13: 52. fig. 2b. 1939. FIG. 9, L.

Stem 1–4 dm. tall, simple or corymbosely branched, the entire plant covered with soft hyaline spreading hairs or strigulose, with longer hairs at the nodes, equally and scattered leafy, 1–7-flowered; leaves pentagonal, 3–6 cm. in diameter, trifid to the base, the outer segments often unequally 2–3-parted, all segments trilobed to the middle or less, the ultimate divisions lanceolate, entire, 1–3 mm. wide, acutish, the middle elongate, strigose above, scattered white-hairy beneath; petioles slender, the lower to 10 cm. long, the main cauline evaginate, ca. as long as the blades, the uppermost almost lacking; lower bracts foliose, trifid, ca. 1 cm. long, the upper linear, entire; pedicels 2.5–7 cm. long, ascending; bracteoles small, filiform, in the upper third or fifth of the pedicel; flowers nodding, dark violet; sepals puberulent to hairy; the upper sepal round-ovate, 13–20 mm. long, 10–12 mm. wide, apiculate, the spur slender, straight, 25–35

mm. long, 3 mm. wide at the base; lateral sepals elliptic, 16–20 mm. long, 10–12 mm. wide, rounded at apex, strigulose on midrib and margin; lower sepals ca. the same, more apiculate; upper petals with a broadly linear lamina 9–10 mm. long, glabrous, emarginate; lower petals dark, the narrow claw 6 mm. long, the deflexed lamina 7 mm. long, bifid to the middle or more, the disc yellow bearded; stamens 5–6 mm. long, glabrous or ciliate; follicles densely white-silky.

TYPE: Szechwan, *Harry Smith 3385* from Hsioeh-shan, 4300 m., Aug. 11, 1922 (w), not seen; isotypes (BM, E), seen.

Differs from *D. pylzowii* in softer pubescence and darker petals.

103. *Delphinium maximowiczii* Franchet, Bull. Soc. Philom. Paris VIII. 5: 164. 1893. FIG. 10, A.

Delphinium grandiflorum L. var. *latisecta* Maxim. Plant. Chin. Potanin. in Acta Horti Petrop. 11: 30. 1890.

Stem subglabrous below to minutely strigulose, more densely so above, slender, much branched, 3–8 dm. tall, scattered leafy; leaves tripartite to near the base, the segments again parted, so that the leaf outline is pentagonal, commonly 2–8 cm. in diameter, the 5 parts deeply incised into lance-oblong sharply pointed teeth or lobes 2–3.5 mm. wide, green and somewhat strigulose above, paler and strigulose beneath especially along the veins; petioles slender, somewhat strigose, somewhat dilated at the base, the lower to 20 cm. long, the upper 1–3 cm.; flowers few, in a corymbose cluster at end of each branch, sky-blue; bracts mostly 3-parted; pedicels slender, divaricate, 2–4 cm. long, strigulose, the bracteoles lance-linear, 3–6 mm. long, near the middle of the pedicel; sepals strigulose, somewhat lighter in color along the middle line; upper sepal ovate, 12–15 mm. long, obtuse, the spur 16–25 mm. long, 2.5–3 mm. wide at base, narrowed gradually to a pointed apex; lateral sepals oblong, 17–19 mm., by 6–7 mm., rounded at apex, the pubescence along the midvein; lower sepals more rhombic, 15–18 mm. long, 7–8 mm. wide, obtuse; upper petals yellowish with blue tinge, slightly oblique, the lamina 9 mm. long, glabrous, somewhat rounded at the apex; lower petals with an oblong-obovate blade 7 mm. by 5 mm., yellow bearded in a patch near the base, entire to lobed, the claw 6 mm. long; stamens 5–6 mm. long, glabrous; anthers 1 mm. long; follicles 3, puberulent, recurved-divergent; seeds squamate.

TYPE: E. Kansu, Fyn-Shan-Ling Mts., *Potanin* in 1885 (some labels, such as on the sheet at Paris have 1881), (P), seen; isotype (K), seen.

RANGE. Apparently at about 2500 to 3500 m., western China and adjacent Tibet.

SEEN. Tibet: Tsarung, *Rock 23243*. Szechwan: *Rock 18327*. Yunnan: *Rock 24272*; *Yü 10504*.

There is considerable variation in the lamina of the lower petal in the above cited specimens, although it has the same general shape throughout. *Yü 10504* has the lamina entire, with some hair outside the basal patch.

Rock 18327 and *24272* have entire lamina without outside hair. *Rock 23243* and *Potanin* have the lamina partly cleft and with short ciliation as well as the basal patch.

104. *Delphinium mollipilum* W. T. Wang, Acta Bot. Sinica 10: 268. 1962.

Stem about 3.5 dm. high, 1–2 mm. thick below, loosely spreading-pubescent, simple, equally foliose; middle cauline leaves with pentagonal lamina, 3.3 cm. long, 6 cm. wide, cordate, trisect, the middle segment broadly rhombic, trifid to below the middle, the middle lobes linear, entire, 3.5 mm. wide, the lateral at an obtuse angle, linear, 1–2-lobulate, the lobules obliquely ovate, subglabrous below, loosely pilose above; petioles equaling the laminae, subterete, indistinctly vaginate, spreading-pilose; upper leaves gradually reduced; inflorescence about 2-flowered; lower bracts trifid into linear lobes, the upper entire, linear; pedicels 3–3.6 cm. long, divergent-erect, with spreading white hairs; bracteoles near the middle of the pedicels, 4.5–6 mm. long, loosely puberulent; sepals purplish blue, oblong to oblong-obovate, 16–17 mm. long, white-puberulent; spur ca. 25 mm. long, slender-subulate, ca. 2 mm. thick at base, straight; upper petals glabrous, yellowish, emarginate; lower petals blue, the limb round-ovate, emarginate, yellowish bearded at base, longer than the appendiculate claw; stamens glabrous; carpels 3, loosely puberulent.

TYPE: Kansu, Sept. 24, 1956, Exped. Hunangho 8928 (PE), not seen; photo. (E), seen.

A specimen from Kansu at ca. 3000 m., Aug., 1914, *Farrer & Purdom 225* (E), in part, seems to belong here. The species is supposed to be close to *D. caeruleum*, but with pedicels spreading pubescent and carpels 3. My interpretation of *D. caeruleum* might almost include this, but that species is restricted to an area farther west.

105. *Delphinium monanthum* Hand.-Mazz. Acta Horti Gothob. 13: 50. 1939. FIG. 10, B.

Delphinium candelabrum (Ostenfeld in Hedin) var. *monanthum* (Hand.-Mazz.) W. T. Wang, Acta Bot. Sinica 10: 78. 1962.

The stem low, to ca. 1.5 dm. tall, subglabrous, with several leaves, purplish, flexuous; leaves pentagonal, the blades mostly 1–3.5 cm. in diameter, with fine pubescence, deeply cordate, trisect to the base, the 2 lateral segments deeply divided to make 5 more or less cuneate segments, each of these deeply 3- or more-lobed, the final divisions 1–5 mm. long, 2–4 mm. wide, rounded-oblong, mucronate; petioles 1–5 cm. long, purplish, slightly dilated at base; flowers solitary, large, deep purplish blue; pedicels erect to horizontal, 5–15 cm. long, retrorse-pubescent, the hairs longer toward the summit; bracteoles usually 2, like reduced leaves, 5–15 mm. long, often near the middle of the pedicel; sepals with rather long fine hairs, the upper 20–25 mm. long, 12–15 mm. wide, broadly ovate, minutely

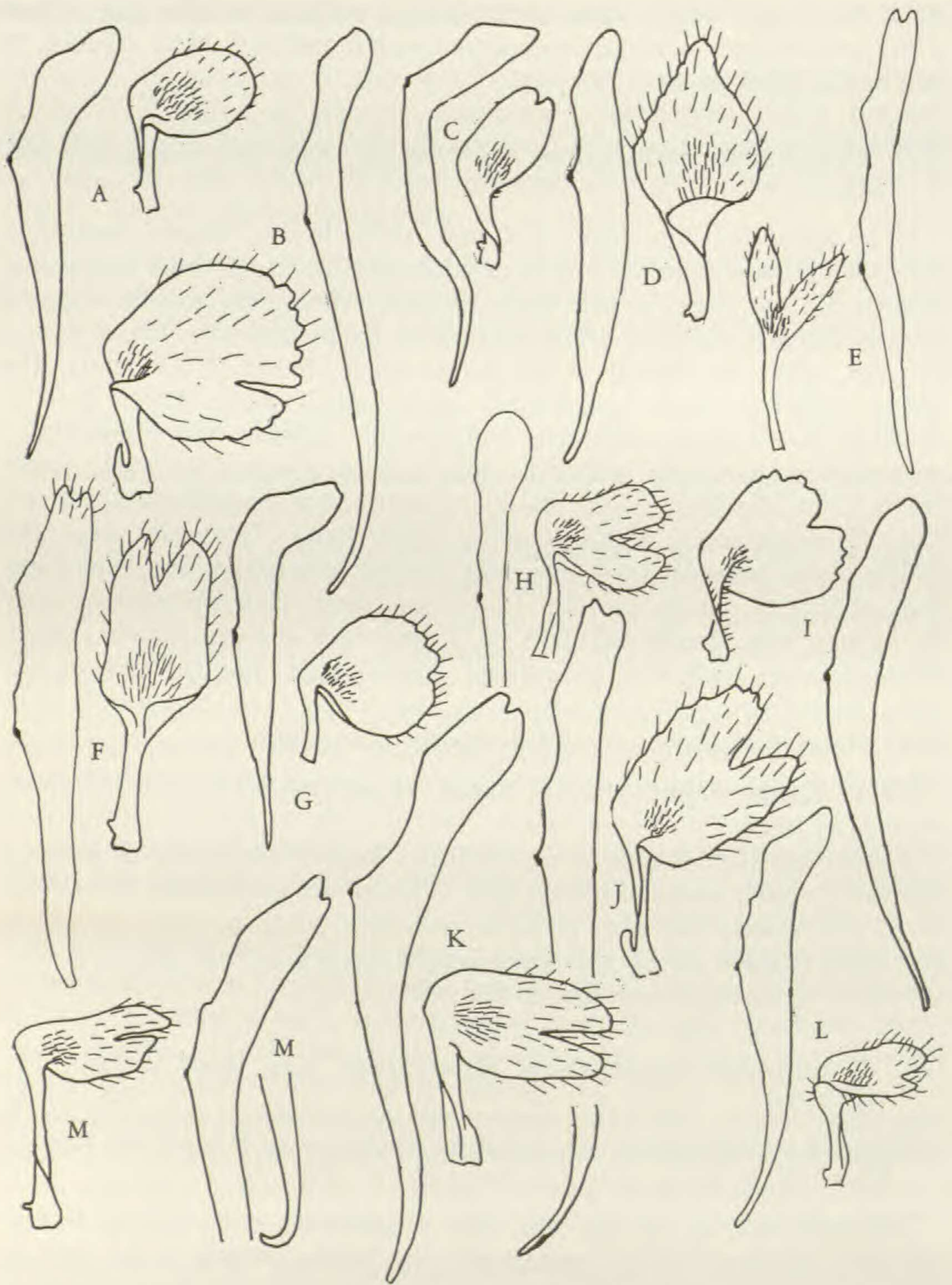


FIGURE 10. *Delphinium*, GROUP VI. Petals, the upper spurred, the lower clawed. A. *D. maximowiczii*; blade of upper petal 9 mm. long, spur 20 mm.; blade of lower petal 7 mm. long, claw 5 mm.; drawn from *Rock 24272* (UC). B. *D. monanthum*; blade of upper petal 12 mm. long, spur 24 mm.; blade of lower petal 11 mm. long, claw 6 mm.; drawn from *Rock 13185* (GH). C. *D. mosoynense*; blade of upper petal 8 mm. long, spur 18 mm.; blade of lower petal 6 mm. long, claw 4.5 mm.; drawn from *Delavay 8* (NY). D. *D. muscosum*; blade of upper petal 8 mm. long, spur 16 mm.; blade of lower petal 11 mm. long, claw 6 mm.; drawn from the published illustration of the TYPE. E. *D. nortonii*; blade of upper petal 15 mm. long, spur 12 mm.; blade of lower petal 7 mm. long,

apiculate, the spur 25–30 mm. long, ca. 4 mm. thick at base, subcylindric; lateral and lower sepals 25 mm. by 15 mm., somewhat erose on the more or less rounded tips; upper petals blue, slightly oblique, the blade entire, 12 mm. long, the spur 24 mm. long; lower petals blue, the lamina almost round, somewhat bearded and crenulate, 11 mm. by 10 mm., slightly bilobed, claw 6 mm. long; stamens 7–8 mm. long, more or less ciliate; anthers dark, 1.5 mm. long; follicles 3, pubescent to glabrous.

TYPE: Szechwan, Dongrergo, 4800 m., Aug. 9, 1922, *Harry Smith 3131*; isotypes (A, MO), seen.

Other material apparently referable here is from Szechwan: *E. H. Wilson 4691* (GH, US). N. W. Yunnan: *G. Forrest 20780* (US). S. W. Kansu: *Rock 13024* (GH, K, NY, US), *13185* (F, GH, K, NY, US); *Farrer & Purdom 253* (E).

106. *Delphinium mosoynense* Franchet, Bull. Soc. Philom. Paris VIII. 5: 168. 1893. FIG. 10, C.

Delphinium grandiflorum L. var. *mosoynense* (Franchet) Huth, Bot. Jahrb. 20: 461. 1895.

Delphinium caeruleum var. *majus* Wang, Acta Bot. Sinica 10: 266. 1962. Wang refers *Rock 13730*, which I had placed in *D. mosoynense*, to this species.

Stem slender, flexuous, branched above, retrorse-strigulose below, usually densely so above, 1–5 dm. tall; lower leaves with long (5–15 cm.) petioles not dilated at base; upper petioles shorter; leaf blades subglabrous to strigulose, divided to base into 5 parts, each of these further incised into divaricate lance-linear lobes mostly 5–20 mm. long, 1–2.5 mm. wide, sharp pointed, more or less inrolled at margins and pale beneath; cauline leaves 1–3, remote; flowers mostly in an open panicle, deep blue, the bracts linear, 5–20 mm. long, or the lowest trifid; pedicels divaricate-ascending, 2–5 cm. long; bracteoles near the middle of the pedicel, linear, 5–8 mm. long; sepals strigulose, the upper 15–18 mm. long, ovate, the spur straight, subulate, ca. 20 mm. long, 3 mm. wide at the base; lateral sepals 12–15 mm. long, 8 mm. wide, obtuse; lower sepals like the lateral; upper petals pale,

claw 6 mm.; drawn from *Norton 369* (K). F. *D. przewalskii*; blade of upper petal 14 mm. long, spur 15 mm.; blade of lower petal 10 mm. long, claw 8 mm.; drawn from *Przewalski* in 1873 (K). G. *D. pseudograndiflorum*; blade of upper petal 8 mm. long, spur 17 mm.; blade of lower petal 8 mm. long, claw 5.5 mm.; drawn from *Hanbury-Tracy 195* (BM). H. *D. pulcherrimum*; blade of upper petal 13 mm. long, spur 18 mm.; blade of lower petal 8 mm. long, claw 6 mm.; drawn from *Ludlow & Sherriff 1997* (BM). I. *D. pumilum*; blade of upper petal 11 mm. long, spur 26 mm.; blade of lower petal 8 mm. long, claw 5 mm.; drawn from *Rock 18316* (K). J. *D. pylzowii*; blade of upper petal 15 mm., spur 27 mm. long; blade of lower petal 10 mm. long, claw 8 mm.; drawn from *Harry Smith 3135* (A). K. *D. pylzowii*; blade of upper petal 13 mm. long, spur 23 mm.; blade of lower petal 9 mm. long, claw 6 mm.; drawn from *Rock 14482* (NY). L. *D. rockii*; blade of upper petal 11.5 mm. long, spur 15 mm.; blade of lower petal 7 mm. long, claw 6 mm.; drawn from *Rock 14543* (GH). M. *D. smithianum*; blade of upper petal 13 mm. long, spur 20 mm.; blade of lower petal 8 mm. long, claw 7 mm.; drawn from *Harry Smith 11274* (MO).

somewhat oblique, entire at apex, the limb 8 mm., the spur 18 mm. long; lower petals blue, ca. 6.5 mm. by 5 mm., yellow bearded in center of base of oblong limb, not ciliate; claw 4.5 mm. long; stamens glabrous, 5 mm. long; anthers dark, 1 mm. long; follicles 3, finely pubescent.

TYPE: Yunnan, on Pee-cha-ko, near Moo-so-yn, north of Tali, *Abbé Delavay* 717, Aug. 31, 1884 (P); seen. Photograph (UC).

DISTRIBUTION. Apparently ranging between 2500 and 4500 m., Yunnan, Szechwan, southwestern Kansu.

EXAMPLES. Yunnan: *Rock* 17338; *Forrest* 6533, 6643, 15233; *K. M. Feng* 2514; *Maire* 7437; *Delavey* 8; *Ducloux* 3875. Szechwan: *Soulié* 2389, 2387; *Handel-Mazzetti* 5103. Tibet: *Kingdon Ward* 10621.

107. *Delphinium muscosum* Exell & Hillcoat, Jour. Roy. Hort. Soc. Lond. 78: 183. 1953. FIG. 10, D.

Perennial from a slender rootstock arising from a thickened elongate root; stems 10–15 cm. tall, many branched from base, hirsute-pilose throughout; basal leaves with petioles to 7 cm. long, flattened at base, pubescent-pilose; blade suborbicular in outline, 2–3 cm. in diameter, trifid to base, the segments divided 3–4 times into ultimate linear pubescent-pilose lobes scarcely 1 mm. wide; cauline leaves short-petioled to subsessile; inflorescence subcorymbose, cymosely branched; flowers solitary at tips of branches, dark blue to dark violet, 3–3.5 cm. long; sepals yellow-hirsute-pilose without, almost glabrous within, the upper elliptic-ovate, 25 mm. by 15–18 mm., the spur 14 mm. by 4.5–6 mm., slightly decurved; lateral sepals elliptic, spatulate, 22 mm. by 11–13 mm.; lower sepals ovate or oblong-ovate, slightly obtusely acuminate, 23 mm. by 14–16 mm., glabrous within; 2 upper petals narrowly elliptic, almost straight, 26 mm. by 4 mm., pubescent within, almost glabrous without, the lamina 8 mm. long, rounded and entire at apex; 2 lower petals with the lamina irregularly ovate, entire, 10–12 mm. by 6–8 mm., yellowish- or whitish-bearded toward claw, the latter 6–7 mm. long; stamens bluish, 7–8 mm. long, glabrous; anthers dark, 1.2 mm. long; follicles 3, tomentellous.

TYPE: Bhutan, Rinchen Chu, at 5000 m., Aug. 7, 1937, *Ludlow & Sherriff* 3537 (BM); isotype (E); seen.

RANGE. Growing on open stony wet scree, 4500 to 5500 m., Bhutan.

EXAMPLES SEEN. *Ludlow, Sherriff & Hicks* 19725 (BM), 19328 (BM), 19375 (BM), 19399 (BM), 16825 (BM), 17102 (BM); *Cooper* 4791 (BM).

A species with leaves as finely dissected as any I have seen.

108. *Delphinium nortonii* Dunn, Kew Bull. 1927: 247. 1927.

FIG. 10, E.

Perennial, 7–10 cm. tall, with dense short spreading pubescence especially above; stems several, 1-flowered; leaves long petioled (2–4 cm.), short-vaginate, the blades orbicular; radical leaves 2–3 cm. in diameter, palmately 3-parted, the segments broadly cuneate, short-petiolate, im-

bricate, palmately incised into obtuse lobes 3–5 mm. long, 2–3 mm. wide; cauline leaves few, similar, smaller; flowers large, violet, inflated-globose, long-pubescent; upper sepal 25 mm. long, 18 mm. wide, broadly ovate, obtuse, the spur 10–15 mm. long, 5–7 mm. wide at the base, subcylindric, obtuse; lateral sepals asymmetrically elliptic-ovate, 18 mm. by 15 mm., rounded-truncate; lower sepals slightly longer, more acute; bracts foliaceous, 1 cm. long; pedicels 4–5 cm. long; bracteoles 2, near middle of the pedicel, tripartite to oblong, to ca. 10 mm. long; upper petals almost straight, the lamina 15 mm. long, 3 mm. wide, somewhat emarginate at the blunt apex, spur 10–14 mm. long; lower petals unequally bifid, yellow bearded, the lamina 7–8 mm. long, 5–6 mm. wide, the bearded lobes 5 mm. by 2 mm.; filaments glabrous, 7–8 mm. long; carpels 3, velutinous.

TYPE: Tibet, sandy soil above Kampa Dzong, 12 miles north of Sikkim, 5000 m., June 17, 1922, *E. F. Norton 369* (κ); seen.

A specimen from Gyong, E. Himalaya, at 4300 m., by *Rohmoo Lepcha*, Sept. 12, 1912 (E), seems to belong here. The species is in the large-flowered group with *D. muscosum*, and seems to key out independently.

109. *Delphinium przewalskii* Huth, Bot. Jahrb. 20: 407. 1895.

FIG. 10, F.

Stem sparsely pilose, increasingly so in the inflorescence, erect, branched at the base, 1.5–2.5 dm. tall; leaves glabrous above, somewhat pilose beneath, deeply 3–5-parted, the parts deeply lacinate into 2–3 lobules 2–6 mm. wide; bracts passing into cauline leaves; bracteoles broadly lanceolate and near the flower or spatulate and remote from it, 1–2 cm. long, 5–7 mm. wide; flowers usually terminal, deep blue, 1 to few in a corymbose raceme; sepals 2–2.5 cm. long, 1.2–1.5 cm. wide, loosely pubescent, subcorniculate at tips; upper sepal ovate, 25 mm. by 15 mm., apiculate; lateral sepals elliptic-ovate, 25 mm. by 15 mm.; lower sepals 28 mm. by 18 mm., acute to acuminate; spur ca. 20 mm. long, straight or arcuate, 3.5 mm. wide at base; upper petals more or less ciliate, dark brown, the lamina almost straight, 15 mm. long, 3 mm. wide, glabrous, emarginate, the spur ca. 15 mm. long; lower petals semibifid, white-ciliate, dark brown at base, yellow bearded, less deeply colored in upper part, the lamina to 10 mm. by 4 mm.; claw ca. 8 mm. long, somewhat appendiculate; stamens 7–8 mm. long, glabrous; anthers purple, almost 2 mm. long; carpels 3, densely hairy.

TYPE: W. Mongolia, "Montes Alaschan," *Przewalski* "1874" in Huth, "1871" on herbarium sheet, "1873" (LE), and "1873" (κ). The 2 Leningrad specimens (1871 and 1873) are on one sheet, with the label "Syntypus."

110. *Delphinium pseudo-caeruleum* W. T. Wang, Acta Bot. Sinica 10: 269. 1962.

Stem ca. 9–10 dm. tall, 3 mm. thick at base, indistinctly 5-angled, re-

trorsely strigulose, many branched, equally foliose; lower cauline leaves long petioled, the upper short or sessile; blades as in *D. caeruleum* and *D. grandiflorum*, the ultimate lobes linear, 1.5–1.8 mm. wide, more or less revolute, ciliate, ventrally subglabrous, villous along nerves dorsally; petioles subglabrous or retrorse-villous below; inflorescence corymbose, 2–5-flowered; lower bracts trifid into linear lobes, others entire, linear; pedicels densely retrorsely strigulose, 3.2–7.5 cm. long, suberect; bracteoles near middle of pedicel, linear, 4–6 mm. long; sepals deep blue, oblong-obovate or narrow-elliptic, minutely puberulent; spur 20–22 mm. long, subulate, straight or slightly decurved; upper petals dilute blue, glabrous, emarginate; lower petals blue, the limb and claw subequal, the limb yellow bearded at base, subelliptic, bifid to middle into triangular, obtusish, ciliate lobes; stamens glabrous; carpels 3, densely brownish-strigulose.

TYPE: Kansu, Si-Ku, 2500 m., July 29, 1951, *T. P. Wang 14658* (PE), not seen. Isotype and photograph (E), seen.

This species suggests *D. mollipilum*, but has strigose stems and pedicels and bifid lower petals.

111. *Delphinium pseudograndiflorum* W. T. Wang, *Acta Bot. Sinica* 10: 275. 1962. FIG. 10, G.

Stem about 3–7 dm. tall, almost glabrous and glaucous, with occasional spreading hairs especially about the nodes and on the pedicels just below the flowers; basal leaves few, the blades to ca. 1 dm. in diameter, subglabrous or with a few spreading and some minute appressed hairs, round-pentagonal in outline, divided almost to the base into obovate segments, cuneate and 1 cm. or more wide with little lobing, or more frequently lacinate into linear parts 1–2–3 mm. wide and 1–6 cm. long, acuminate; cauline leaves largely of the latter type, scattered and gradually reduced up the stem; lower petioles to 10 or more cm. long, very slightly vaginate at the base, the upper much shorter; inflorescence open, branched, the racemes lax, few to several flowered; lower bracts trilobed, others entire, linear-subulate, 5–15 mm. long; pedicels arched or erect, 2–10 cm. long; bracteoles linear, 3–7 mm. long, near the flower or lower; sepals deep blue, often tinged purple, strigulose and with longer hairs without, more or less crinkled on margin; upper sepal round-ovate, 13–20 mm. long, rounded-obtuse, the spur 22–26 mm. long, 2.5 mm. wide at base, straight or somewhat decurved; lateral sepals elliptic-oblong, 16–20 mm. by 6–10 mm., rounded at apex; lower sepals elliptic-oblong, similar to but slightly wider than the lateral; upper petals light colored, the blade slightly oblique, 8 mm. by 2.5 mm., glabrous, subentire, the spur ca. 17 mm. long; lower petals blue, the lamina strongly oblique, round-obovate, 8 mm. by 6.5 mm., deeply emarginate, yellow bearded at base, ciliate, the claw 5–6 mm. long; stamens 5–6 mm. long, ciliate; anthers dark, 1 mm. long; carpels 3, hairy, with dark veining, ca. 12 mm. long by 3 mm. wide, the styles an additional 3 mm.; seeds angled, winged, 1.2 mm. long.

TYPE: Szechwan, Hei-shin, 2400–3300 m., July–Aug., 1957, *H. Li* 74016 (PE), not seen; photo. of type and isotype seen (E).

RANGE. Growing in fields and scrub up to 5000 m., Tibet, western China.

EXAMPLES SEEN. **Tibet:** *Hanbury-Tracy* 195; *Kingdon Ward* 10881, 10621, 12077; *Ludlow & Sherriff* 687, 2595, 499; *Ludlow, Sherriff & Taylor* 6093, 5162, 13920; *Rock* 14538. **Szechwan:** *H. Stevens* 458 in part; *Harry Smith* 3985. **Yunnan:** *G. Forrest* 16951, 15112, 6538, 23185; *Schneider* 3250; *Yü* 13481; *H. Wang* 41742. **Sikang:** *H. Smith* 13764. **Kansu:** *R. C. Ching* 922, 1070; *Rock* 13178, 14594.

Near to *D. grandiflorum* and referred here is much of the more western material that formerly was identified as that species. It has longer spurs, a more erose lower petal and sometimes looser stem-pubescence. Wang (p. 275) proposed also var. *glabrescens* with glabrous pedicels and var. *lobatum* (p. 276) with more deeply lobed lower petal-laminae. I have had no material of these, and from descriptions only, must refer them to synonymy.

112. *Delphinium pulcherrimum* W. T. Wang, *Acta Phytotax. Sinica* 6: 370. 1957. FIG. 10, H.

Stem 1.5–3 dm. tall, equally scattered-leafy, striate, densely retrorse-pubescent or subglabrous, few branched; basal leaves lacking; lower cauline leaves long petioled, upper shorter, 3.5–7.5 cm.; leaf blades pentagonal-orbicular, cordate, 3–4 cm. in diameter, 3-parted almost to the base, middle segments elliptic-rhombic, long acuminate, laciniate, the lobules oblong-linear, 2 mm. wide, acute or rounded at apex, strigose; laterals unequally 2–3-parted, the secondary parts long acuminate, laciniate; petioles 1.5–7 cm. long, vaginate; flowers blue purple; pedicels to 6 cm. long; bracteoles near the flowers, lanceolate to elliptic, 8–11 mm. long, ciliate; sepals round or broadly elliptic, short-acuminate, loosely puberulent without, 17–22 mm. long, 12–17 mm. wide, spur 23–25 mm. long, 3 mm. wide at the base, straight or decurved, obtuse; upper petals 13 mm. long, 2 mm. wide, obtuse, unequally 2-lobulate, glabrous; lower petals 14 mm. long, the limb elliptical, bifid to the middle into 2 ovate, loosely ciliate lobes rounded at apex, yellow bearded below the middle, the claw equaling the limb, appendiculate; stamens 6–7 mm. long, glabrous; carpels 3, densely silky.

TYPE: Yunnan, A-tun-tze, Pai-ma-shan, Shu-ling, 4240 m., Aug. 3, 1937, *T. T. Yü* 9330 (PE), not seen; photo. (E), seen.

OTHER MATERIAL referable here. **Southern Tibet:** *Ludlow & Sherriff* 1997, 1958; *Rock* 14460. **Kansu:** *E. Licent* 4686; *R. C. Ching* 1123.

113. *Delphinium pumilum* W. T. Wang, *Acta Bot. Sinica* 10: 268. 1962. FIG. 10, I.

Stems 10–16 cm. tall, to 1 mm. thick below, spreading-pilose, 1-foliate

above, simple or rarely 1-branched; basal leaves 3–4, long petioled, the blades pentagonal-reniform, 7–14 mm. long, 13–24 mm. wide, cordate, trisect, the middle segment rhombic-obovate, cuneate at base, 3-parted to below the middle, the parts lance- or oblong-linear, 1–2 mm. wide, acutish, entire or with 1 lobule; lateral segments flabellate, unequally bipartite to the base, the upper parts like the middle segment but slightly oblique, the lower subequal to the preceding, unequally twice parted into ultimate linear lobules, slightly revolute, strigose beneath, loosely silky pilose above, the petioles 2–6 cm. long, spreading-pilose, short vaginate; cauline leaf similar; inflorescence corymbiform, mostly 2-flowered; bracts leaflike or small, linear, 6 mm. long; pedicels 2–9 cm. long, subequal, the hairs white, spreading or retrorse and yellow, glandular; bracteoles near or above the middle of the pedicel, linear-subulate, 3–4.5 mm. long, with loose spreading puberulence; sepals blue, elliptic or elliptic-obovate, 12–14 mm. long, loosely puberulent, the spur subulate, 33–38 mm. long, 3–3.5 mm. wide at the base, slightly curved; upper petals glabrous, emarginate; lower petals blue, the limb broad-obovate, yellow bearded at base, ca. 6 mm. long and wide, subtruncate at tip, emarginate, glabrous or loosely puberulent, claw as long as the limb; stamens glabrous; carpels 3, pilose.

TYPE: Szechwan, Muli, Sept. 14, 1959, S. K. Wu 2662 (PE), not seen; photo. (E), seen.

The author compares *Delphinium pumilum* with *D. caeruleum* and *D. tatsienense*, all three being small plants. I refer here, Szechwan, Muli Kingdom, *Rock 18316*; Mt. Konka, *Rock 16886*. Yunnan, *Yü 14413*.

114. *Delphinium pylzowii* Maxim. ex Regel, *Gartenflora* 25: 289–290. *pl.* 879. 1876; Maxim. *Bull. Acad. Pétersb.* 23: 307. 1877.

FIG. 10, J, K.

Delphinium pylzowii var. *trigynum* W. T. Wang, *Acta Bot. Sinica* 10: 78. 1962, in part, as to *Rock 13194* and *14501* cited by Wang.

Delphinium caeruleum var. *macranthum* Finet, *Jour. Bot. Morot* 21: 98. 1908. Based on *Soulié 3903, 3911, 3914* from Yargong, Batang. Seen (P).

Delphinium caucasicum var. *tanguticum* Maxim. *in schedis*.

Delphinium tanguticum (Maxim.) Huth, *Bull. Herb. Boiss.* 1: 331. *pl.* 15. 1893. Type. Szechwan, G. N. Potanin, 1885 (LE), seen; isotype (K), seen.

Delphinium labrangense Ulbrich ex Rehder & Kobuski, *Jour. Arnold Arb.* 14: 11. 1933, *nomen*. Proposed for *Rock 14482, 14483, 14504, 14513*.

Perennial from a more or less woody subterranean base, the stems 1 to several, slender, 1–3 dm. tall, simple and 1-flowered or few branched and few flowered, pilose to retrorsely strigulose, the hairs in the upper part less appressed, very dense, short to rather long and fine; lower leaves 3- or 5-parted, 1.5–2.5 cm. across, the parts more or less cuneate, broad, coarsely 3-toothed at tip, the petioles very slender, 2–5 cm. long, somewhat dilated at base; main cauline leaves few, more deeply lacinate into oblong lobes 2–3.5 mm. wide, 4–10 mm. long; bracts entire to 3-lobed, the lobes entire, to 7 mm. wide or lacinate; pedicels erect, 2–10 cm. long; bracteoles linear,

near the middle of the pedicel, linear to lanceolate, 5–15 mm. long, setaceous, to 5 mm. wide; calyx deep blue; upper sepal ovate, 15–22 mm. long, 10–15 mm. wide, obtuse, with fine rather long hairs, spur somewhat decurved, 24–28 mm. long, ca. 3.5 mm. wide at base, only gradually narrowed into a somewhat obtuse tip; lateral sepals broadly ovate, 20–22 mm. long, 16–18 mm. wide, obtuse; lower sepals 24 mm. by 15 mm., ovate, obtuse; upper petals from yellowish with a blue margin to almost black-purple, the laminae straight, not toothed to erose or emarginate, about 14 mm. long, the curved spur 25 mm. long; lower petals bearded, the elliptic-ovate lamina ca. 8 mm. long, divided to ca. 5 mm., the claw ca. 5 mm. long; stamens 7–8 mm. long, glabrous; anthers dark, narrow, 1.5 mm. long; carpels 5 or 3, pubescent; seeds with low lamellate papillae.

TYPE: Kansu, Terra Tangutorum, *Przewalski*, 1872 (LE), seen; isotype (P), seen.

RANGE. About 3500 to 4500 m., Kansu, Szechwan, eastern Tibet.

ILLUSTRATIONS. MAXIMOWICZ, *Fl. Tangut.* 1: *pl.* 3. 1889; *Gartenflora* 25: *pl.* 879. 1876; *Bot. Mag.* 145: *pl.* 8813. 1910.

REPRESENTATIVE MATERIAL. Kansu: *Przewalski* in 1880; *Rock* 13093, 13041, 14644, 14625, 13086, 13088, 13023, 14641; *Farrer & Purdom* F 710. Szechwan: *Wilson* 3094, 4691; *H. Smith* 3135, 2961, 3384, 4283. Tibet: *Ludlow & Sherriff* 8854, 9902.

115. *Delphinium rockii* Munz, sp. nov.

FIG. 10, L.

Stem ridged, dark, to ca. 1 m. tall, 4–5 mm. thick, more or less strigulose, branched above, scattered-leafy; petioles scarcely dilated at the base, the cauline to 1 dm. long, somewhat retrorse-pilose; cauline leaf blades generally reduced up the stem, 3–7 cm. in diameter, rounded-pentagonal, strigose above, more loosely so beneath, cleft almost to the base, the divisions rather narrow, 3–8 mm. wide, laciniate or lobed into ultimate parts 1–3 mm. wide, acute; inflorescence open paniculate, the ultimate branches leafy-bracted and bearing umbellate clusters of 3 or more flowers; bracts ca. 1 cm. across, deeply laciniate; pedicels 2–3 cm. long, divergent, strigulose, not glandular; bracteoles subtending the flower, strigulose, 2–3 mm. long, 1 mm. wide; sepals bluish purple, strigulose, the upper sepal oblong-ovate, 18–20 mm. long, 10–11 mm. wide, obtuse, the spur decurved, strigulose, 14–16 mm. long, 3 mm. wide at the base, the other sepals elliptic-ovate, 15 mm. long; petals dark, the upper laminae suberect, glabrous, entire, obtuse, 11–12 mm. long, the spur 15 mm. long; lower laminae oblong, 7 mm. long, unequally shallowly bilobed, the upper surface white-hairy at the base, ciliate; the claw 6 mm. long, appendaged; stamens glabrous; carpels 3, glabrous.

Caulis ad 1 m. altus, 4–5 mm. crassus, strigulosus, supra ramosus; petioli vix dilatati, ad 1 dm. longi, retrorso-pilosi; laminae foliorum caulium 3–7 cm. latae, rotundato-pentagonales, supra strigosae, infra laxe pubescentes, alte lobatae, laciniis ultimis 1–3 mm. latis; inflorescentia paniculata; rami cum bracteis foliosis et umbellis 3–5 florum; pedicelli

2–3 cm. longi, divergentes, strigulosi; bracteolae strigulosae, 2–3 mm. longae; sepala azureo-purpurea, strigulosa; sepalum superiore oblongo-ovatum, 18–20 mm. longum, 10–11 mm. latum; calcar 15 mm. longum; sepala latiora et inferiora elliptico-ovata, 15 mm. longa; petala atropurpurea; laminae superiores glabrae, integrae, obtusae, 11–12 mm. longae; laminae inferiores oblongae, 7 mm. longae; inaequaliter bilobatae, base hirsutae, ciliatae; unguis 6 mm. longus, appendiculatus; stamina glabra; carpella 3, glabra.

TYPE: Eastern Tibet, grasslands between Labrang and Yellow River; valley of Kachiassu, 3000 m., Aug. 5, 1926, *J. F. Rock 14543* (GH).

The proposed new species is near *D. henryi* and *D. trisectum* in the shape of the lamina of the lower petal and in having the bracteoles very near the base of the flower; but differs in its more paniculate inflorescence and its upper petal entire at the apex.

116. *Delphinium smithianum* Hand.-Mazz. Acta Horti Gothob. 13: 49. 1939. FIG. 10, M.

Perennial from an elongate root, with 1 or more stems 3–12 cm. high, simple or few-branched, suberect, more or less purplish, leafy and with short spreading hairs; leaves reniform-pentagonal in outline, the blades 2–5 cm. wide, bifid or trifid to near the base into cuneate obovate divisions, the 2 lateral ones deeply divided to make 5 subequal parts, obovate, 2–3-lobed, these lobes each with 2 or 3 broad teeth rounded at the apex, 1–3 mm. long and ca. 2 mm. wide, the parts somewhat more puberulent beneath than above; petioles slender, 2–6 cm. long, dilated at base, somewhat pubescent; flowers 1–4 on a stem; pedicels 3–8 cm. long, suberect, arising in upper axils; bracteoles 2, leafy, ca. 3-lobed, 6–8 mm. long, placed above the middle of the pedicel; sepals broadly ovate, obscurely violet, fine-hairy; upper sepal 18–20 mm. long, 14 mm. wide; spur 20–22 mm. long, 5 mm. wide at base, subcylindrical, horizontal, blunt; lateral sepals round-ovate, obtuse, pubescent mostly along the purplish midvein; lower sepals 22 mm. by 14 mm., acute, pubescent; upper petals dark, the laminae straightish, 13 mm. long, slightly and unequally bidentate, the spur 20 mm. long; lower petals dark, the oblong blade enlarged somewhat distally, bearded, ca. 8 mm. long, bifid ca. 1/3 its length, the narrow claw 7 mm. long; stamens 7–8 mm. long, glabrous; anthers dark, 1.2 mm. long; carpels silky villous; seeds wingless.

TYPE: Sikang, Kangting (Tachienlu), 4600 m., Aug. 20, 1934; *Harry Smith 11274*, type (w), not seen; isotypes (A, MO), seen.

117. *Delphinium sordidecaerulescens* Ulbrich, Notizbl. Bot. Gart. Berlin 12: 356. 1935. FIG. 13, A.

Erect perennial, sparsely branched, 6–8 dm. tall; stem slender, yellowish green with purplish base, very sparsely hairy; basal leaves gone by anthesis; cauline leaves few, remote, gradually reduced up the stem; lower

petioles to 18 cm. long, slightly dilated at the base; blades suborbicular, 4–5 cm. in diameter, about septemfid, the segments 2–3-partite into linear lobes 1–3 mm. wide, acutish, sparsely pilose; upper leaves trifid into entire linear lobes; the inflorescence open paniculate, glabrous to somewhat pubescent on the pedicels with white hairs; bracts linear, 5–20 mm. long; pedicels divergent, 3–9 cm. long, suberect, slightly curved; bracteoles linear, 4–6 mm. long, well below the flower; sepals sordid-bluish, somewhat crisped-pubescent, with a greenish tubercle below the apex; upper sepal ovate, 11–12 mm. long, 8 mm. wide, obtuse, the spur straight, spreading, 22–23 mm. long, 3.5 mm. wide at the base, very slender toward the tip; lateral sepals oblong, 9 mm. long, 7 mm. wide, round-truncate at the apex; lower sepals 14 mm. long, 7 mm. wide, obtuse; petals pale, whitish or yellowish, the upper laminae entire, oblique, ca. 7 mm. long, glabrous, somewhat pointed, the spur about 20 mm. long; lower laminae oblong-obovate, somewhat erose, about 6 mm. long, 4.5 mm. wide, yellow-bearded at the base, short-ciliate on the margin, the claw appendiculate, 5–6 mm. long; stamens 6–7 mm. long, glabrous; anthers dark; carpels 3, pilose, 8–9 mm. long, the filiform styles another 2–3 mm.; seeds glabrous, ca. 3 mm. long.

TYPE: "Szechwan, reg. bor. Huang-chen-kuan, in prato, 3400 m.," *Harry Smith 3983* (UPS; seen through the courtesy of Dr. J. A. Nannfeldt).

This species is very close to *Delphinium pseudograndiflorum* Wang, over which its name has priority. Its flowers are apparently much paler in color and smaller, and without more material for comparison I am maintaining the two species.

118. *Delphinium sutchuense* Franchet, Bull. Soc. Philom. Paris VIII. 5: 178. 1893. FIG. 11, A.

Stem erect, sparsely pubescent to glabrous, scattered-leafy to the top, 4–8 dm. tall; lower petioles slender, not or scarcely dilated; blades 6–9 cm. wide, fine-pubescent, 3–5-sect, the segments oblong, entire at base, narrow-cuneate, ca. 3 cm. wide above, subpetiolulate, distally trifid, then incised into few, long-acuminate, very pointed lobes, 2–4 mm. wide; inflorescence branched, the branches erect, almost appressed to the central stem, bare, with a 2–6-flowered raceme at the summit; upper bracts linear-subulate, the bracteoles subulate, a little below the sepals, 10–12 mm. long, very narrow; pedicels twice as long as flowers, closely strigulose; flowers violet blue, strigulose; upper sepal ovate-oblong, obtuse, 11 mm. by 7 mm., spur 13–18 mm. long, horizontal or slightly ascending, obtuse; other sepals ca. 15 mm. long; petals blue, the upper oblique, the lamina 9 mm. long, emarginate, possibly few-haired at the apex; lower laminae oblong-ovate, 5.5 mm. by 4 mm., bearded at base, ciliate, divided almost halfway into rather broad lobes, claw appendiculate, 5 mm. long; follicles 3, silky.

TYPE: W. China, in north of province of Sutchuen (Szechwan), *Potanin*, 1885 (P); seen.



FIGURE 11. *Delphinium*, GROUP VI. Petals, the upper spurred, the lower clawed. A. *D. sutchuense*; blade of upper petal 12 mm. long, spur 15 mm.; blade of lower petal 5.5 mm. long, claw 5 mm.; drawn from *Potanin*, 1885, TYPE (P). B. *D. tatsienense*; blade of upper petal 10 mm. long, spur 30 mm.; blade of lower petal 9 mm. long, claw 5 mm.; drawn from *Stevens 114* (F). C. *D. tenii*; blade of upper petal 10 mm. long, spur 17 mm.; blade of lower petal 6 mm. long, claw 5 mm.; drawn from *Ten 581* (UC). D. *D. tenii*; blade of upper petal 10 mm. long, spur 18 mm.; blade of lower petal 8 mm. long, claw 6 mm.; drawn from *Schneider 2510* (GH). E. *D. tenuipes*; blade of upper petal 8 mm. long, spur 12 mm.; blade of lower petal 6 mm. long, claw 5 mm.; drawn from *Stewart & Rahman 25125* (BM). F. *D. triste*; blade of upper petal 12 mm. long, spur 13 mm.; blade of lower petal 7 mm. long, claw 6 mm.; drawn from *Ikonnikov-Galitsky 82* (UC). G. *D. tsoongii*; blade of upper petal 14 mm. long, spur 25 mm.; blade of lower petal 8 mm. long, claw 5 mm.; drawn from *Rock 13093* (GH). H. *D. tsoongii*; blade of upper petal 10 mm. long, spur 20 mm. long; blade of lower petal 7 mm. long, claw 5 mm.; drawn from *Rock 14547* (GH). I. *D. williamsii*; blade of upper petal 10 mm. long, spur 17 mm.; blade of lower petal 6 mm. long, claw 6 mm.; drawn from *Polunin, Sykes & Williams 1907*

119. *Delphinium tatsienense* Franchet, Bull. Soc. Philom. Paris VIII. 5: 169. 1893. FIG. 11, B.

Delphinium bonatii Lévl. Repert. Sp. Nov. 7: 99. 1909. Type, Yunnan, Ducloux 596, isotypes (E, UC), seen. Lauener & Greene, Notes Bot. Gard. Edinb. 23: 585. 1961, referred this to *D. grandiflorum*.

Delphinium soonmingense Chen, Bull. Fan Mem. Inst. Biol. Peiping (n.s.) 1: 175. 1948. Based on *Y. P. Chang* 450 from Soonming (PE?); not seen. This referred to synonymy under *D. tatsienense* by W. T. Wang, Acta Bot. Sinica 10: 267. 1962.

Delphinium pycnocentroides var. *latisectum* W. T. Wang, Acta Bot. Sinica 10: 164. 1962. Type *C. W. Wang* 66226 (PE), not seen; isotype seen (A).

Stem 2–6 dm. tall, slender, simple or with slender branches, subglabrous to strigulose, the hairs tending to be more spreading in upper parts; leaves remote, few, the lower petioles to 1 dm. or longer, slender, strigulose, not vaginate at base; the upper shorter; blades 3–8 cm. or wider, divided to base into 3 or 5 parts that are narrow-cuneiform at their base, deeply incised into obtuse linear lobes commonly 2–4 mm. wide, green and scantily pubescent above, paler and more pubescent beneath; flowers few, in an open corymb or short raceme; lower bracts foliaceous, trifid into linear lobes 1–1.5 cm. long or simple; pedicels arched-ascending to straight, commonly 2–several cm. long, strigulose; bracteoles linear, often more than 2, commonly lance-linear, 4–8 mm. long, near the middle of the pedicel or above; sepals deep blue, pubescent; upper sepal broadly ovate, obtuse, 20 mm. by 12 mm., the spur horizontal, quite straight, 30 mm. long, 3 mm. wide at base, slender, narrowed to rather an acute point; lateral sepals oblong, 17 mm. by 9 mm., rounded-truncate at tip, pubescent along midvein; lower sepals 20 mm. by 10 mm., narrow-obovate, obtuse; upper petals bluish, oblique, 10 mm. long, glabrous, the spur very slender, almost 30 mm. long; lower petals blue, oblong-obovate, the lamina 9 mm. by 6 mm., subentire to cleft at tip for 2 mm., ciliate, densely bearded near base of the blade, the claw 5 mm. long, narrow; stamens 6–7 mm. long, the filaments slightly ciliate; anthers dark, 1.2 mm. long; follicles 3, short-pubescent, 12–15 mm. long, 3–4 mm. wide, the styles an additional 3 mm.; seeds winged on angles.

TYPE: Szechwan, near Tatsienlou, *Henri d'Orléans & Bonvalot*, July 29, 1890 (P); seen. Photographs of type (BH, E, UC); seen.

DISTRIBUTION. Largely at 2500 to 3000 m., western China.

EXAMPLES. Szechwan: *Soulié* 2027, 2381, 2382, 2489, 2380; *H. Stevens* 89, 114; *H. Smith* 4660, 10798, 13764; *W. P. Fang* 4276; *Cunningham* 193, 355, 490; *Wilson* 3096. Yunnan: *Yü* 12941, 14527; *Forrest* 6494, 11449, 22378; *Maire* 380, 720; *Rock* 18485, 6292, 7770, 11485, 10686, 11545; *Schneider* 2739, 2182. Tibet: *Rock* 23243; *Soulié* 3529.

(BM). *J. D. wilsonii*; blade of upper petal 9 mm. long, spur 19 mm.; blade of lower petal 7 mm. long, claw 6 mm.; drawn from *E. H. Wilson* 2396 (NY). *K. D. yuanum*; blade of upper petal 6 mm. long, spur 12 mm.; blade of lower petal 5 mm. long, claw 4 mm.; drawn from *Yü* 12490 (A). *L. D. yunnanense*; blade of upper petal 7.5 mm. long, spur 22 mm.; blade of lower petal 5.5 mm. long, claw 4 mm.; drawn from *Delavay* 967 (NY).

120. *Delphinium tenii* Lévl. Repert. Sp. Nov. 7: 98. 1909.

FIG. 11, C, D.

Delphinium dolichocentrum W. T. Wang, Acta Bot. Sinica 10: 162. 1962.

Based on Yunnan, Atuntze, *T. T. Yü* 9885 (PE), not seen; photo. (E), seen.

Stems divaricate, slender, 8–15 (–45) cm. tall, white-villous, simple; leaves basal and a few cauline, the lower petioles very slender, 2–4 cm. long, spreading-villous, somewhat dilated at the base, the cauline not dilated, the upper shorter; leaf blades 2–4 cm. wide, more or less triangular, divided to base to form 3 cuneate-obovate segments, green and finely strigulose above, paler and with longer white hairs beneath, these segments trifid and somewhat additionally lobed into oblong-linear, obtuse parts 2–4 mm. wide; flowers few in an open corymb; bracts ordinary leaves; pedicels strigose or spreading-pubescent, to 6 cm. long; bracteoles leafy, ternate or entire, and elliptical, at about the middle of the pedicel; sepals deep blue, strigose; upper sepals 12–15 mm. long, 8–10 mm. wide, obtuse, the spur decurved toward the apex, 20–22 mm. long, 3 mm. wide near the base, gradually narrowed toward the slender tip; lateral sepals elliptic-oblong, 13–15 mm. long, 6–8 mm. wide, rounded at the apex; lower sepals 12–15 mm. long, 5–8 mm. wide, obtuse; petals bluish, the upper laminae almost straight, entire, glabrous, 10 mm. long, the spur 17 mm. long; lower laminae oblong, emarginate, 6 mm. long, 2.5 mm. wide, bearded near the base and sparsely elsewhere, claw 5 mm. long; stamens 6–7 mm. long, filaments moderately widened; anthers blue, 1 mm. long; follicles 3, hairy, 12–14 mm. long; seeds 2 mm. long, narrowly winged on angles.

TYPE: Yunnan, Lou-Fou near Tong-Tchouan, June, 1906, *Simeón Ten* 581 (E), isotype (UC); seen.

EXAMPLES. All from Yunnan: *T. T. Yü* 9885 (A), 13336 (A); *C. W. Wang* 64707, 69117, 64733, 69174, 69397, all (A); *H. T. Tsai* 56240 (A), 51974 (A); *K. M. Feng* 2841 (A); *Rock* 18205 (A, US); *C. Schneider* 2510 (GH).

121. *Delphinium tenuipes* Tamura, Acta Phytotax. Geobot. 16: 141. 1956.

FIG. 11, E.

Root woody, 5 mm. thick; stem 1 m. tall, 3 mm. thick, simple, terete, erect, glabrous above the white-pilose base; radical and lower stem leaves broadly reniform, 7–9 cm. wide, 3-partite to near the base, the lateral segments bipartite, all cuneate-obovate, pinnatifid into oblong or ovate-oblong lobes, acute or obtuse, glabrous above, sparsely white-hairy beneath; petioles 8–10 cm. long; upper leaves glabrous, 3-parted, the lateral segments 2-parted, all oblong, 1–3-toothed or entire, the blades 4–6 cm. long, 6–7 cm. wide, petioles 3–4 cm. long; racemes laxly branched below, the branches arcuate-divaricate, with about 20–22 flowers; bracts linear, 2.5–5 mm. long; pedicels 15–45 mm. long, slender, arcuate-ascending, bibracteolate above the middle, viscid pilose apically with yellow hairs; bracteoles linear, 2 mm. long; flowers blue; spur cylindrical, gibberulate below the apex, 10–11 mm. long, 2 mm. wide; sepals glabrous, 9–11 mm.

long, 3–5 mm. wide; upper petals glabrous, the lamina ca. 8 mm. long, entire, somewhat oblique; lower petals bifid, white bearded; carpels 3, viscid-pilose.

TYPE: Afghanistan, Nuristan, Chatrass, 2100 m., *Kitamura*, Aug. 2, 1955 (KYO, not available).

A specimen from West Pakistan, Swat, Kalam to Utrot, 2500 m., July 20, 1953, *R. R. Stewart & A. Rahman 25125* (BM) seems to me to match the illustration by Kitamura, *Fl. Afghan.* 125. *fig. 51.* 1960.

122. *Delphinium trisectum* W. T. Wang, *Acta Bot. Sinica* 10: 80. 1962.

Stems 4.5–5 dm. tall, 3–6 mm. thick at base, densely retrorse-strigulose, simple or with one branch above, subequally foliose; cauline leaves long petioled, the blades broadly reniform (3–)4.5–6.5 cm. long, (5.2–)7.5–12 cm. wide, basally cordate, trisect, the segments broadly obovate or rhombic-obovate, 3-lobed to the middle, the lobes 3-lobulate to the middle, these lobules lance-ovate, entire or 1-toothed, lateral lobes also bifid and much divided; petioles 15–17 cm. long, indistinctly vaginate; racemes 10–14-flowered, lax; lower bracts short petioled and trisect, the segments lanceolate, the upper bracts linear; pedicels 2–7 cm. long, densely retrorse-pubescent; bracteoles near the flowers, lance-linear, 7–9 mm. long, 1 mm. wide, puberulent; sepals purple, elliptic to elliptic-obovate, 14–17 mm. long; spur slightly longer than sepals, cylindric-subulate, straight or slightly decurved; petals dark brown, emarginate, glabrous; lower petals with elliptical laminae, bilobed, long-ciliate, yellow bearded near the base; stamens glabrous; follicles 3, spreading, puberulent.

TYPE: Honan, Shang-Cheng, 400 m., April 19, 1959, *Honan Exped. 149* (PE), not seen; photo. seen (E). Near *Delphinium henryi* and *D. rockii*.

123. *Delphinium triste* Fisch. ex DC. *Syst.* 1: 362. 1817. FIG. 11, F.

Delphinium obscurum Stev. ex DC. *Syst.* 1: 362. 1817, *nomen pro synonym.*

Stem 3–7 dm. tall, slender, simple or few branched above, leafy, retrorse-strigulose below, the hairs less appressed in the inflorescence; lower petioles slender, somewhat dilated at the base, 5–12 cm. long, the upper shorter; laminae broader than long, subglabrous to strigulose (especially beneath), mostly 4–12 cm. wide, divided quite to the base into 3 or 5 parts, these narrow-cuneate below, obovate, deeply laciniate into linear lobes 1.5–4 mm. wide, acute; racemes lax, 3–15-flowered, the lower bracts trifid, pubescent, to 2 cm. long, others linear-lanceolate, to ca. 1 cm. long; pedicels ascending, pubescent, 2–5 cm. long; bracteoles lance-linear to linear, mostly somewhat below the sepals, 3–6 mm. long; sepals purplish black, cinereous pubescent, the upper sepal ovate, 22 mm. long, 12 mm. wide, rounded-obtuse, the spur almost straight, 12–14 mm. long, 5 mm. wide at the base, obtuse; lateral and lower sepals rhombic-ovate, 14–15 mm. by

10–11 mm., rounded at apex; petals black, the upper laminae slightly oblique, entire but slightly irregular and crisped on the rounded setose tip, ca. 12 mm. long, the spur 13 mm. long; lower laminae bearded on both sides, ovate, 7 mm. long, 5 mm. wide, cleft for about 2 mm. into rather broad lobes, claw 6 mm. long; stamens 7–8 mm. long, the filaments much broadened at base, glabrous; anthers dark, oblong, 1.3 mm. long; follicles 3, somewhat divaricate, densely pubescent, 14–17 mm. long, ca. 4 mm. wide, the styles an additional 3 mm.; seeds brown, 2.5 mm. long, densely clothed with overlapping transverse rows of scales.

TYPE: "Hab. in Daouria circa Doroninsk (Vlassof ex Fisch.)." I have seen a sheet from Dahuria, *Herb. Fischer* (LE, P) which may be type material. Two other specimens loaned from Leningrad both from the Herb. Ledebour are *Turcz.*, 1829 and *Turcz.* no. 929. The Turczaninow material agrees well with the Herb. Fischer sheets.

ILLUSTRATIONS. KNOWLES & WESTCOTT, *Fl. Cabinet* 2: *pl.* 54. 1838; J. W. LOUDON, *Ladies' Flower Garden of Ornamental Perennials* 1: *pl.* 10. 1843.

This very distinctive species with dark flowers is represented by the following Mongolian collections: "In alpibus sajanensibus, *Radde*" (K, LE, P); "In pratis ad fl. Dschida" *Turczaninow* (K, P); *Ikonnikov-Galitzky* 82 (UC); Lake Kosogol, *Newburg*, in 1924 (A, UC).

124. *Delphinium tsoongii* W. T. Wang, *Acta Phytotax. Sinica* 6: 368. 1957. FIG. 11, G, H.

Stem 6–9(–50) cm. long, simple or branched, with short white, usually retrorse hairs, rather equally leafy throughout; lower petioles up to 7 cm. long, slender, with white scattered hairs, somewhat vaginate, progressively shorter up the stem; leaf blades broader than long, cordate, 1–5 cm. in diameter, 5-parted to the base, the petiolulate parts repeatedly divided into ultimate oblong-linear lobes mostly 1–2 (–3) mm. wide; inflorescence glandular-villous with white and yellowish hairs, each branch ending in a 2–7-flowered corymb; lower bracts dissected, foliose, the upper entire, lance-linear; pedicels ascending, 2–5 cm. long; bracteoles linear, slightly above the middle of the pedicel, 2–4 mm. long; sepals dark purplish blue to bright blue or paler, villous; upper sepal elliptic to broadly ovate, 13–16 mm. long, 6–8.5 mm. wide, the spur slender, slightly decurved toward the narrow tip, 20–25 mm. long, 2.5–3 mm. wide at the base; lateral and lower sepals elliptic-oblong, rounded to obtuse at tip, 14–18 mm. long; upper petals dark, with a slightly oblique lamina 10 mm. long, the tip rounded and entire; lower lamina oblong, oblique, 7 mm. by 4 mm., cleft for 2 mm., yellow bearded near the base, subglabrous to white-hairy on remainder, claw 5 mm. long; stamens 6–7 mm. long, glabrous; anthers dark, 1.5 mm. long; follicles 3, hairy, divergent at tips, 15–17 mm. long, the styles an additional 2.5 mm. long; seeds black, obpyramidal, 1 mm. long, covered with minute scales.

TYPE: Tibet, between Cha-chia and Chiao-tuao, Aug. 9, 1953, *P. C. Tsoong 6073* (presumably PE, not seen).

If I understand this species at all, I would refer here *Rock 14547* from Tibet (GH, NY); *Rock 13154* (GH, US) and *13193* (GH, NY), both from Kansu; and *R. C. Ching 534* (GH, US) from Kansu.

Delphinium tsoongii is near *D. mosoynense* but has somewhat smaller floral parts and a different range.

125. *Delphinium williamsii* Munz, sp. nov.

FIG. 11, I.

Perennial from long branching woody roots; stems rather slender, 4–10 dm. tall, freely and openly branched in upper half, scattered leafy, but the leaves more abundant below, largely glabrous except for the strigulose tips of the inflorescence; lower petioles 5–10 cm. long, very slender, subglabrous, more or less dilated at the base, the upper petioles shorter; leaf blades to 1 dm. broad, 5-fid to near the base, sparingly strigulose to subglabrous, ciliate, variegated, being rather pale near the center, paler on under surface, the segments narrow at the base, obovate-rhombic, lobed then dissected into ultimate parts largely 1–2 mm. wide, acute-mucronate; upper cauline leaves with almost filiform ultimate divisions; inflorescence open, the racemes lax, axes subglabrous, several flowered, to ca. 2 dm. long; bracts linear, 5–12 mm. long, or the lower divided; pedicels divergent, 1.5–5 (–10) mm. long, somewhat strigulose toward the tips; bracteoles near the middle of the pedicels or above, linear to sublanceolate, 2–5 mm. long; sepals dull white with greenish tips, subglabrous except for minute appressed hairs on basal parts; upper sepal oblong-ovate, 14–18 mm. long, 8 mm. wide, apiculate, the spur straight, spreading, subcylindric, 18–21 mm. long, 3 mm. wide at base, rather blunt; lateral sepals elliptic-oblong, 16–18 mm. long, 7–8 mm. wide; lower sepals slightly narrower; petals whitish, the upper lamina strongly oblique, 10 mm. by 4 mm., glabrous, subemarginate, the spur ca. 13 mm. long; lower laminae round-ovate, 6 mm. long, somewhat bearded, short-ciliate, bifid about 1/3 its length into rather broad lobes; claw 6 mm. long; stamens 5–6 mm. long; anthers rather dark, roundish, less than 1 mm. long; carpels 3, strigose.

Caules tenues, 4–10 dm. alti, supra laxe ramosi, disperso-foliosi, praeter strigulosos apices inflorescentiae glabri; petiola basalia, 5–10 cm. longa; laminae ad 1 dm. longae, 5-fidae, subglabrae aut parce strigulosae, ciliatae, segmentis dissectis, laciniis 1–2 mm. latis; inflorescentia laxa, racemi laxi, ad 2 dm. longi; bracteae lineares (aut inferiores divisae), 5–12 mm. longae; pedicelli divergentes, 1.5–5 (–10) cm. longi, plus minusve strigulosi; bracteolae lineares, 2–5 mm. longae; sepala albida, subglabra; sepalum superiore oblongo-ovatum, 14–18 mm. longum, 8 mm. latum, apiculatum, calcar extensum, 18–21 mm. longum; sepala lateralia et inferiora elliptico-oblonga, 16–18 mm. longa; petala albida, lamina superior obliqua, 10 mm. longa, glabra, subemarginata; lamina inferior late

ovata, hirsuta, ciliata, bifida, unguis 6 mm. longus; stamina 6 mm. longa; carpella 3, strigosa.

TYPE: Nepal, near Gilam, Tila Valley, 1900 m., April 19, 1952, mainly near cultivated terraces, *O. Polunin, W. R. Sykes & L. H. J. Williams 1907* (BM).

Another collection is from Nepal, Dillihot, 2600 m., banks of cultivated fields, *Polunin, Sykes & Williams 3916* (BM). The proposed species, *Delphinium williamsii*, is near *D. kamaonense*, but with white, not blue, flowers and a longer spur. It is a pleasure to dedicate it to Mr. L. H. J. Williams of the Department of Botany, British Museum (Natural History).

126. *Delphinium wilsonii* Munz, sp. nov.

FIG. 11, J.

Root woody; stem terete, slender, 6–8 dm. tall, few leaved in the lower part, glabrous except for a few long hairs near the base; basal petioles 5–12 cm. long, spreading-villous, the cauline shorter, not vaginate; leaf blades rounded pentagonal, 3–7 cm. in diameter, with a few slender hairs along the veins of the under surface, 5-fid to near the base into rhombic segments, each rather deeply lobed into few lance-oblong laciniae 1–2.5 mm. wide; cauline leaves 2–3, reduced; inflorescence rather simple, racemose, few flowered, to ca. 1.5 dm. long, glabrous except for the loosely strigose upper parts of the pedicels; bracts linear, 4–6 mm. long; pedicels suberect, 1–2 cm. long; bracteoles subulate, 2–3 mm. long, near middle of pedicel; flowers blue, the sepals strigulose; upper sepal elliptic-ovate, 13–14 mm. long, obtuse, the spur almost straight, 20 mm. long, 3.5 mm. wide at base; other sepals round-elliptic, 13–14 mm. long; petals bluish, the upper laminae oblique, subacute, 9 mm. long, glabrous, the spur 18–19 mm. long; lower petal laminae oblong-obovate, 7 mm. long, with 2 oblong lobes, hairy near the base, ciliate; the claw 6 mm. long; stamens glabrous; carpels 3, slightly hairy at base of styles.

Caulis teres, tenuis, 6–8 dm. altus, infra paucifolius, subglaber; petiola basalia, 5–12 cm. longa, villosa; laminae foliorum orbiculare-pentagonales, 3–7 cm. longae, infra in venis sparsim villosae, 5-fissae, laciniis 1–2.5 mm. latis; folia caulium 2–3; inflorescentia subsimplex, racemosa, paucis floribus; bracteae lineares, 4–6 mm. longae; pedicelli suberecti, 1–2 cm. longi; bracteolae subulatae, 2–3 mm. longae, in medio pedicelli; sepala azurea, strigulosa; sepalum superiore elliptico-ovatum, 13–14 mm. longum, obtusum, calcar horizontale, 20 mm. longum, base 3.5 mm. latum; sepala lateralia et inferioria orbiculari-elliptica, 13–14 mm. longa; petala subazurea, laminae superiores obliquae, subacutae, 9 mm. longae, glabrae; laminae inferiores oblongo-obovatae 7 mm. longae, bilobatae, base hirsutae, ciliatae, unguis 6 mm. longus; stamina glabra; folliculi 3, apice subhirsuti.

TYPE: W. Hupeh, central China, July, 1901, *E. H. Wilson 2596* (possibly 2396) (NY). *Delphinium wilsonii* keys to near *D. tenii* and *D.*

dolichocentroides; but it has strigulose rather than glabrous pedicels and comes from Hupeh not Szechwan or Yunnan.

127. *Delphinium yuanum* Chen, Bull. Fan Mem. Inst. Biol. Peiping (n.s.) 1: 176. 1948. FIG. 11, K.

Stem 10–13 dm. tall, 4–5 mm. thick, glabrous and somewhat glaucous below, subglabrous to somewhat hairy above, remotely leafy, somewhat branched above; lower petiole to 2 or 3 dm. long, somewhat dilated at base, glabrous or with a few spreading hairs; blades pentagonal-orbicular in outline, 5–15 cm. in diameter, 5-fid to base, subglabrous or with scattered hairs and some very short appressed ones, the 2 lower divisions often again deeply parted to make 5 or 7 segments, these cuneate-obovate, the lower leaves with 3 or more blunt oblong lobes 3–5 mm. wide, the upper and middle 3-incised, then again divided into oblong-linear lobes 2–3 mm. wide, subobtuse, mucronulate; inflorescence simple and lax or few-branched, the flowers ca. 15–30; bracts foliaceous or mostly entire, linear, 8–15 mm. long, somewhat hairy; pedicels ascending, more or less arcuate, 1–5 cm. long; bracteoles linear, hairy, 3–6 mm. long, situated somewhat below the flower; sepals blue, white-pubescent with short appressed and somewhat longer, spreading, white and yellow hairs; upper sepal ovate, 12 mm. by 8 mm., obtuse, the spur spreading subcylindric, 14 mm. long, 3 mm. wide at base, obtuse; lateral sepals elliptic, 11 mm. by 6 mm., rounded at apex, the pubescence mostly on the midrib; lower sepals oblong-obovate, 12 mm. by 5 mm., rounded at apex; petals blue, the upper laminae quite oblique, broadened upward, glabrous, 6 mm. long, the spur 12 mm. long; lower laminae oblique, yellow bearded near base, sparsely white-hairy and ciliate beyond, 5 mm. by 4 mm., oblong-obovate, scarcely to shallowly bilobed, dilated below, glabrous, gradually narrowed into a broad claw 4 mm. long; stamens 6 mm. long, glabrous; anthers dark, oblong, 1 mm. long; follicles 3, subglabrous.

TYPE: N. W. Yunnan, Chungtien, 3000 m., *T. T. Yü* 12490, July 27, 1937 (PE), not seen; isotype (A) and photograph of type (E), seen.

I have seen three collections from Yunnan at the Arnold Arboretum, which seem to me to belong here: Atuntze, 3400 m., *T. T. Yü* 10547; Muli, Wachin, 4000 m., *T. T. Yü* 14613; Chungtien, 3300 m., *T. Yü* 13852.

128. *Delphinium yunnanense* (Franchet) Franchet, Bull. Soc. Philom. Paris VIII. 5: 173. 1893. FIG. 11, L.

Delphinium denudatum var. *yunnanense* Franchet, Plant. Delav. 25. 1886.

? *Delphinium yunnanense* vars. *laxum* and *strictum*, Huth, Bot. Jahrb. 20: 465. 1895. No specimens cited.

Delphinium esquirolii Lévl. & Vaniot, Bull. Herb. Boiss. II. 6: 505. 1906. I have seen *Esquirol* 744 (E) from Lévl. Herb. as *D. esquirolii*; *Esquirol* 794 or 793? (E) as *D. esquirolii* sp. nov.; and *Esquirol* 190 (E).

Stem simple or branched, 2.5–7.5 dm. tall, more or less retrorse-strig-

ulose below, subglabrous above, terete; leaves light green, few and remote, finely and thinly pubescent, the petioles slender, mostly 4–8 cm. long, strigulose, dilated at the base, blades more or less round-ovate in outline, 4–12 cm. wide, pentagonal with usually 5 segments to near the base, these cuneate and divaricately and coarsely sharp toothed in the lower leaves or lobed and then toothed with narrow divisions 1–3 mm. wide in the cauline leaves; upper leaves few lobed; flowers few in lax racemes or these in an open panicle, the lowest bracts sometimes foliose, dissected, the upper setaceous, 5–15 mm. long; pedicels mostly glabrous, ascending or erect, 2–5 cm. long; bracteoles opposite, setaceous, 2–5 mm. long, a little above the middle of the pedicel; sepals deep blue, finely strigulose, the upper sepal ovate, 12 mm. long, subacute, the spur horizontal, 20–22 mm. long, ca. 2 mm. wide at the base, slender, narrowed and straight to the fine tip; lateral sepals 10–12 mm. long, strigulose on midrib, rounded at apex, broadly ovate; lower sepals more generally strigulose, about as large; upper petals almost straight, the limb 7.5 mm. long, notched at apex, the slender spur 22 mm. long; lower petals bluish, the blade sparsely bearded except at base, long-ciliate, oblong-obovate, 5.5 mm. long, divided for about 2 mm., the claw 4 mm. long; stamens 5–6 mm. long, the filaments somewhat ciliate; anthers dark, 1 mm. long; follicles 3, subglabrous to strigose; seeds obtusely obpyramidal, transversely wrinkled, with straight wings on the angles.

TYPE: Yunnan, in the plain of Mosoyn, *Delavay 967 bis*, Aug. 31, 1886 (P), seen; isotypes (K, NY), seen; photographs of type (BH, E, UC), seen.

DISTRIBUTION. The species is found at about 1800 to 3800 m., Yunnan.

EXAMPLES. *Forrest 15536, 2977, 7216; Henry 13440, 9272; Maire 389, 1196; Ducloux 7329, 370, 5866; Delavay 9, 6515, 6670, 5866; Simeón Ten 134; T. T. Yü 17375; Martin & Bodinier 1789; Rock 6551, 6902; Ching 21657; Feng 89.*

Huth (Bot. Jahrb. 20: 465. 1890) proposes vars. *laxum* and *strictum* without typification, so one does not know what he had in mind.

NOMEN INCERTUM

129. *Delphinium lepidum* Fisch. & Avé-Lall. Ind. Sem. Horti Petrop. 9: 70. 1843.

Judging from the description which speaks of narrow segments in the leaves and which compares the flowers with those of *D. grandiflorum* L., this plant would fall in my Group VI. It has been compared to *D. triste*, which does not reach nearly so far west as the Caucasus, whence *D. lepidum* was described. I have seen no type specimen and cannot place it at all. Herewith is a translation of the original description.

Leaves 3-sect, the segments divided into entire linear lobes; spur longer than the calyx; lamina of upper petals suboval, subentire, 2-toothed above the middle, long-pilose on both sides and on margin; seeds not lamellate. — Plant showy, 4.5 dm. Stem short-pubescent. Lower

pedicels much longer than bract and flower. Calyx deep blue, subglabrous. Lower petals entire at tip, anterior shallowly bifid, with broad cleft. Flowers larger than in *D. grandiflorum* and with suborbicular entire lamina of upper petals, short-ciliate, short-pubescent beneath, bearded to base above. Caucasus at Kobi. Perennial.

Another name about which I am quite uncertain is *Delphinium cheilanthum* subsp. *schizophyllum* Brühl in Brühl & King, Ann. Roy. Gard. Calc. 5: 99. 1896. It was based on a collection by Col. Davidson on the China hill near Naini Tal, Kumaun. I have seen no material by Davidson and can only guess by the name "schizophyllum" that the plant may belong in Group VI.

[*To be continued*]